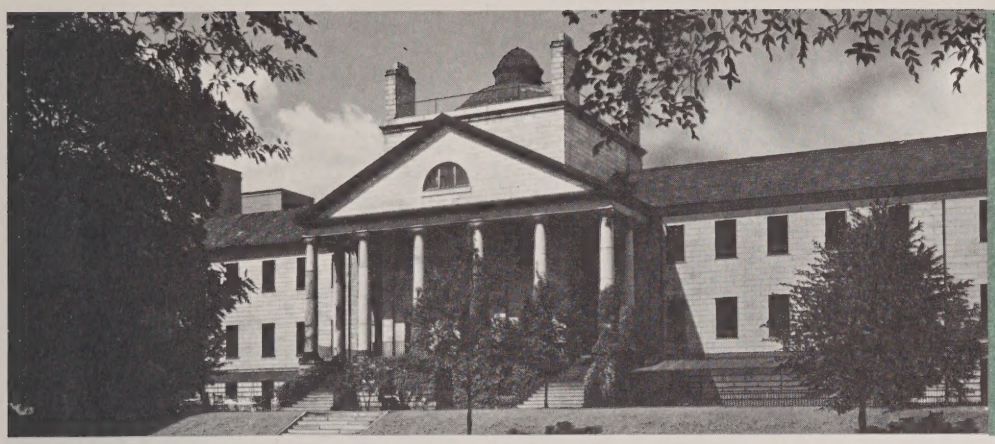

MGH News

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Probing Lung Disease Mysteries With a Cyclotron

A New Tool to Pinpoint the Patient's Problem

A 24-year-old Greater Boston man leaned back in his chair. Covering his mouth was a black mask.

"The patient is ready," a white-garbed physician said into an intercommunications speaker.

"I'm sending the CO_2," a voice shot back.

The invisible, radioactive gas came through a hose and into a black bag attached to the mask.

"Take a breath," the doctor said reassuringly to the patient. Counters that measure radioactivity were held in place over the patient's back to record the dispersal of the gas in the lungs from the one breath.

From this safe test, the physician obtained detailed information about the ventilation and blood flow in the lungs. A second equally safe test, with a radioactive gas called xenon, provided further details.

This information was available no other way. The tests were made with gases manufactured on the spot by the MGH cyclotron.

One of about four such hospital cyclotrons in the country, it is the only one primarily employed for lung problems.

The patient undergoing the test had cystic fibrosis, a disease in which a thick, sticky substance clogs various glands. One of the many complications is lung infection.

Michael had been treated in another hospital for many years. He started losing weight and suffered recurrent fevers.

X rays showed the disease was confined to the upper part of the right lung. The left lung appeared fine.

Another test showed that his lungs were failing to get anywhere nearly enough oxygen to his blood. The problem seemed more general than what the X rays indicated.

Ordinarily Michael's diseased upper right lung lobe would have been removed. Yet his condition was too poor to permit surgery.

At that point the hospital treating him referred him to the MGH for isotope studies. The radioactive gases turned up a surprise: blood flow and other functions were much poorer in the left lung than the obviously diseased right.

As a result of the tests, a physiotherapist began treating Michael. She concentrated on the left lung where secretions and chronic infection were causing the problem.

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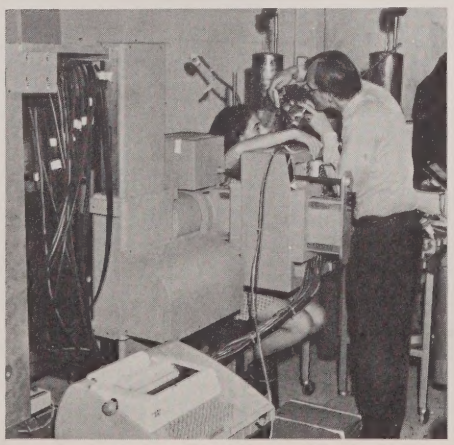

Dr. Reginald Greene using positron camera

MGH scientists are beginning to shed light on some of the dark secrets of emphysema and chronic bronchitis.

Basic facts about these common, serious lung diseases remain scarce. But the new research is at least showing a glimmer of promise of finding out what goes wrong.

The tool which makes the studies possible is the MGH cyclotron. Used by the hospital in a number of other investigations as well, it also serves to diagnose various patient problems (other front-page story).

The cyclotron, under the direction of Bernard Hoop, Ph.D., is located in the Cardiopulmonary Building and operated by the Physics Research Laboratory.

Unlike Harvard University's cyclotron which is employed by the MGH to treat patients (November 1969, *MGH News*), the hospital's own machine is designed solely to make radioactive chemicals. They must be made and used near the cyclotron site.

Various radioactive chemicals the MGH cyclotron produces are unavailable commercially because they lose their radioactivity in minutes. This quick-vanishing act makes these products harmless to the patient. Since they tend to be gases that are inhaled, their administration is also painless.

By using them, the physicians are learning much about lung circulation. They are finding out how the lung acts or fails to act in various illnesses.

Two of these are the aforementioned emphysema and chronic bronchitis. Together they are known as obstructive lung disease.

"The cyclotron studies are really be-

(Continued on Page 4, Col. 1)

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EDITORIALS:

A Staggering Need

In May of 1970 the *News* published excerpts from a speech delivered at the hospital by Dr. John Platt. The University of Michigan biophysicist called for a massive reordering of priorities to cope with the problems faced by the world. In this issue Dr. Leon Eisenberg, Chief of Psychiatry at the MGH, looks through a psychiatrist's lenses at world problems. Like Dr. Platt he urges a surge of new and careful scientific investigations into these problems. As a psychiatrist, however, Dr. Eisenberg concentrates on the behavioral aspects. He wants researchers to learn more about why man acts the way he does. Only with such knowledge, he reasons, can mankind alter its present course toward annihilation.

As it did earlier with Dr. Platt's views, the *News* agrees with Dr. Eisenberg's general thesis. Surely there is a staggering need for greater understanding of the "why" behind man's inhumanity to man. But with all such desperately needed information comes an equally great need for caution in applying it. Knowledge of what to do carries, as a corollary, knowledge of what not to do. Dr. Eisenberg himself points to the diabolic misuse to which Adolf Hitler put some of the unscientific concepts of Konrad Lorenz. But even well-founded science carries with it the seeds for potential misguided use. And so the critically needed type of information explosion urged by Drs. Platt and Eisenberg must be followed fast – or when possible even preceded – by scrupulous attention to its application. Otherwise we might hoist ourselves on the well-intended petard we design for purposes of peace.

The Importance of Outside Support

The articles in this issue relating to the MGH cyclotron point up the importance to hospital research of outside support. National Institutes of Health funds bought a computer used with the system and paid much of the cost of the cyclotron itself. Atomic Energy Commission funds financed the cost of designing and constructing the positron camera. The MGH supplied the genius to devise and construct the camera and to innovate uses for the cyclotron and computer.

Together hospital expertise, and government, and private-foundation support lend an unbeatable combination that results in better patient care.

Not Can It Be Done But Should It

(In a previously unreported speech at the recent 150th anniversary observance of famed McGill University of Montreal, Dr. Leon Eisenberg outlined some of the fundamental issues facing mankind.

Dr. Eisenberg, who is Chief of Psychiatry at the MGH and Professor of Psychiatry at Harvard Medical School, charged that the "logic" of some scientists like Konrad Lorenz laid a "scientific" foundation to justify the action of Nazi Germany.

Noting how little we know about human behavior, the MGH psychiatrist called for widespread studies to learn more about what makes man behave the way he does. Observing that the time is short, he termed these the sciences of survival.

He concluded optimistically that man is the master of his own destiny. An optimistic approach, he said, is required to make success possible. The following is an abbreviated version of the speech. Editor's note.)

— — —

With each decade, the vast impact of scientific findings translated into technology radically reshapes the way we live. Technical capacity has been the ruling imperative, with no reckoning of cost, ecological or personal. *At long last, we are beginning to ask: not, can it be done, but should it be done?*

The challenge is to our ability to anticipate the second- and third-order consequences of interventions in the world ecology before the event, not ruefully afterward.

The power of our technology so foreshortens the time between its application and the possibility of its correction that we must learn to think through before we act out.

If we were to understand each other even half so well as we comprehend the energy of the stars, we might yet spare ourselves the horrors we face from traducing those energies into weapons that endanger all life.

If psychiatry cannot yet provide a firm basis for that understanding, it may nonetheless be of service if it dispels the myths and the pseudoknowledge that obscure the search for truth.

Whether in psychiatry or everyday living, what we believe in profoundly

influences us. The doctor's very presence relieves pain.

Teachers' expectations govern pupils' performance. The citizens' confidence in the benevolence of the social order maintains its stability.

What we believe of man affects the behavior of men, for it determines what each expects of the other. Theories of education, of political science, and of economics are based on implicit concepts of the nature of man.

Is he educable? Is he actuated only by self-interest? Is he a creature of such dark lusts that only submission to sovereign authority can save him from himself?

I am not suggesting that we ignore scientific evidence when it does not fit our wishes. I am suggesting, first, that there is no solid foundation for currently fashionable theories and, second, that belief helps shape actuality because of the self-fulfilling character of social prophecy.

Pessimism serves to maintain the status quo. It is a luxury for the affluent, a way to avoid guilt for political inaction, a comfort to those who enjoy the amenities of privilege. Pessimism is too costly for the disenfranchised; they give way to it at the price of their salvation.

We must believe that man can become fully human in order for him to attain his humanity. Restated, an optimistic view of man's potential is a precondition for social action to make actual that which is possible.

Yet ethologist Konrad Lorenz, for example, found it possible to write, in 1940, that the effects of civilization on human beings parallel those of domestication in animals.

In domesticated animals, he argued, changes for the worse in heredity result in a loss of the inborn ability to choose mating partners of a type which would help maintain the purity of the stock. Similar phenomena accompany civilization unless the state is vigilant.

Professor Lorenz wrote:

"The selection for toughness, heroism, social utility . . . must be accomplished by some human institution if mankind, in default of selective factors, is not to be ruined by domestication-induced degeneracy. . . . We must – and should – rely on the healthy feelings of our best and charge them with the selection which will determine the prosperity or the decay of our people."

Lorenz's "scientific" logic justified Nazi legal restrictions against intermarriage with non-Aryans.

The wild extrapolations from domestication to civilization, from ritualized animal courtship patterns to human behavior, from species to races, are so gross and unscientific, the conclusions so redolent of concentration camps that further commentary seems superfluous.

Perhaps it is impolite to recall in 1971 what was written in 1940, but 1940 is difficult to forget. Indeed, it should not be forgotten, lest we find ourselves in Orwell's 1984 for the very best of "scientific" reasons.

What I inveigh against is the formulation of pseudoscientific support for social ideologies that are projected onto, not "found" in, nature.

Let us agree: Behavior, like structure, is under genetic control. Animals of two species, reared in an identical environment, will nonetheless behave differently. However, genetic evidence does not imply imperviousness to environmental influences.

Even in closely related species, differences are more revealing than similarities in elucidating the principles that govern behavior.

Song sparrows, isolated from their species and foster-reared by canaries, nonetheless acquire their own song. On the other hand meadowlarks, similarly isolated as fledglings, acquire the song of the foster species: wood pewees, yellowthroats, or redwing blackbirds.

Man's biological equipment, evolved over the last five million years, provided the means for survival in an environment not yet altered by the artifacts man created.

It is becoming painfully evident that the changes we have wrought in the past five decades threaten our continuing survival under conditions of widespread population growth. It now becomes relevant to ask: How adaptable is man?

Is mere perpetuation of the species, without concern for the quality of life, a sufficient criterion for man, even if it has been so for nature? Man's intelligence permits him the conscious choice of goals and so differentiates him from the rest of animate existence.

One trait common to man everywhere is language. In the sense that only the human species displays it, the capacity to acquire language must be genetic.

Languages, insofar as they have been studied, appear to share fundamental structural characteristics, a universality that argues for an as-yet-to-be-identified basis in common structures in the central nervous system.

Further refinement in our knowledge of these cognitive universals may yet enable us to propose models of nervous-system mechanisms which might then be sought experimentally. That quest will be long and arduous.

If language be one of the common

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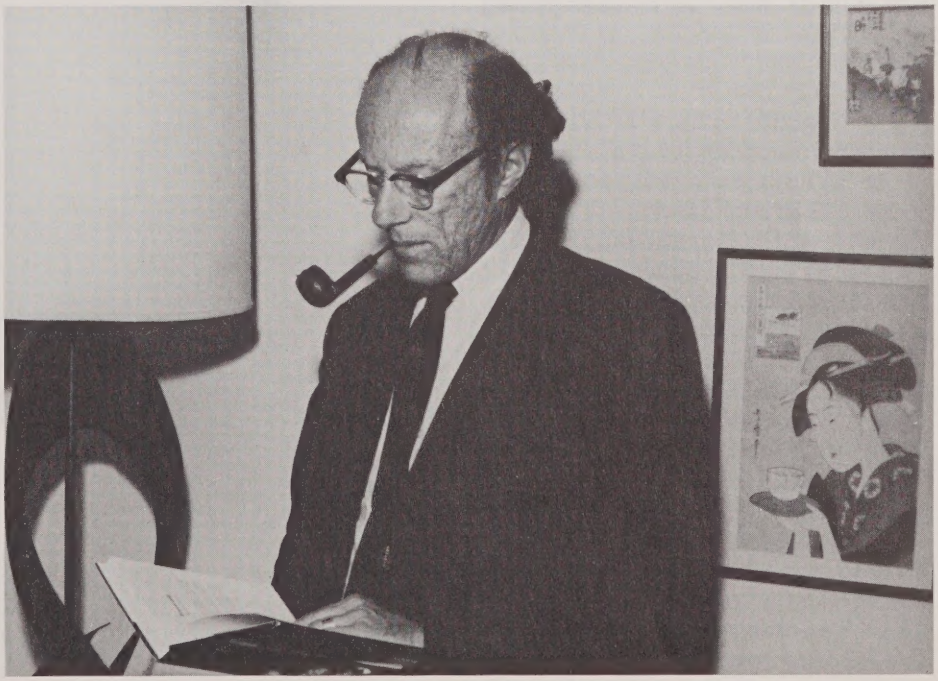


DR. LEON EISENBERG

Probing Lung Disease Mysteries

(Continued from Page 1)

ginning to tell us a whole lot about this very unknown disease," said Dr. Homayoun Kazemi, Chief of the Pulmonary Unit. "Where does it start? How does it begin to act?

"We can't do much about it unless we know what is wrong in the first place, and this has really been the dark area in this particular disease.

"We therefore want to be able to identify the earliest changes that take place in the lung in obstructive lung disease, the commonest kind of lung disease we see."

In both emphysema and chronic bronchitis, the lungs become less and less efficient about taking in vital fresh air and getting rid of stale, used air.

Physicians can help victims of emphysema, but the disease remains incurable. To find a cure, doctors will probably need to know much more about emphysema. They believe that observation of initial changes in the lung should at the very least make early treatment possible.

Dr. Jere Mead of the Harvard School of Public Health has developed some preliminary thoughts on the matter. He presented some data suggesting that the small air passages to the lungs undergo changes too small to detect in the early stages of the disease.

The difficulty was that his studies had to be done in lungs of people who had already died, or in dogs. Using conventional techniques, investigators could not study living people without endangering them.

Dr. Reginald Greene of the MGH has used nitrogen$_{13}$ to perform completely safe studies in living people with disease. Obtained from the cyclotron, this radioactive gas is inhaled by the patient.

Like the other short-lived radioactive chemicals produced by the device, its radioactivity disappears too quickly to harm the patient any more than a conventional X ray. And it causes the patient no discomfort.

Dr. Greene already reports some preliminary results. As the animal studies had indicated, emphysema-like diseases appear to begin in small air passages in the outer boundaries of the lung. By the time conventional tests (called lung-function tests) indicate a problem, the disease is far advanced.

Dr. Greene's work suggests that much earlier these tiny airways collapse at pressures that would not cause collapse in normal lungs. As a result, the airways close, trapping air.

The lungs then have difficulty performing the usual air exchange. Getting fresh oxygen into the blood becomes the most serious problem.

"We have now seen groups of patients who have been totally without symptoms and have only minimal abnormalities," Dr. Kazemi said. "We can actually demonstrate that they have abnormal airway closure, and we are beginning to get to the first stages in the development of heart and lung disease.

"Now the hospital is also using the same technique to see what happens when you have a myocardial infarction; and there may be some degree of heart failure at the time of the infarction itself. You can collect in the lung small quantities of fluid which are not detectable by any other means but may turn out to lead to closing of the airways."

Dr. Kazemi sees some hope that studies made available by the cyclotron-produced isotope will lead in another direction: detection of the exact size and appearance of the area damaged by a heart attack. A group, under the overall direction of Dr. Charles Sanders, is investigating this possibility.

Easy access to such information would advance understanding of heart disease and aid in treating it.

Other studies envelop a wide area. Under Dr. Paul S. Russell, Director of Transplantation, Dr. Benjamin Barnes is using cyclotron products to study in animals the difficulties of lung transplantation. Various groups are attacking other lung problems.

And the Radiology Department under Dr. Juan Taveras hopes to look at damage in the brain of people who have had strokes.

A NEW TOOL

(Continued from Page 1)

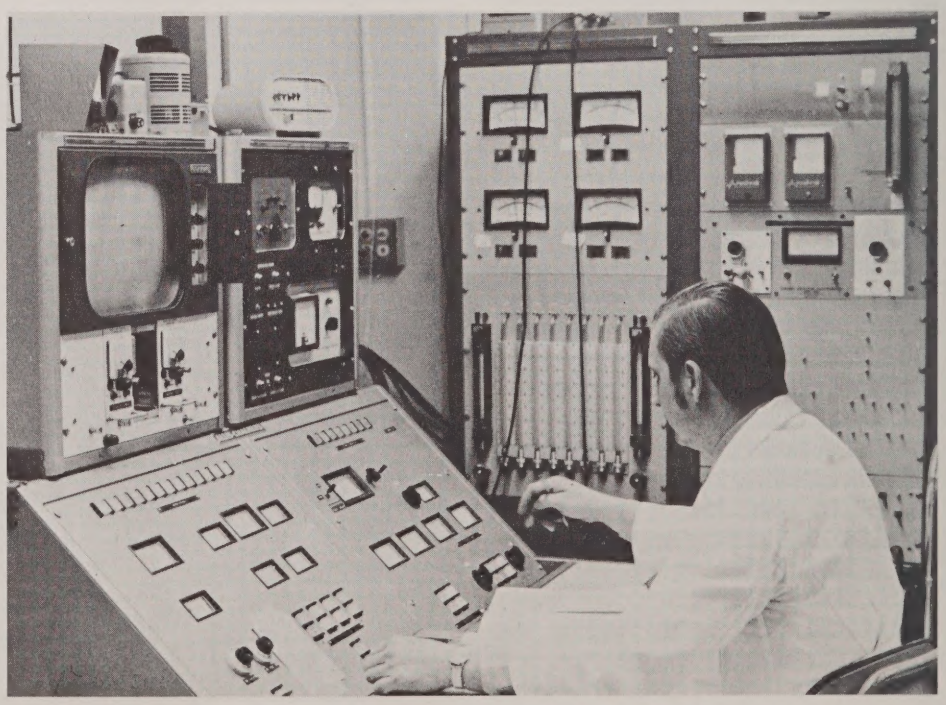
With the secretions largely gone after two weeks of therapy, Michael improved dramatically. His lungs returned to near normal range for expelling used air in the form of carbon dioxide and for getting oxygen into the blood.

His condition improved so much that he could undergo the needed surgery.

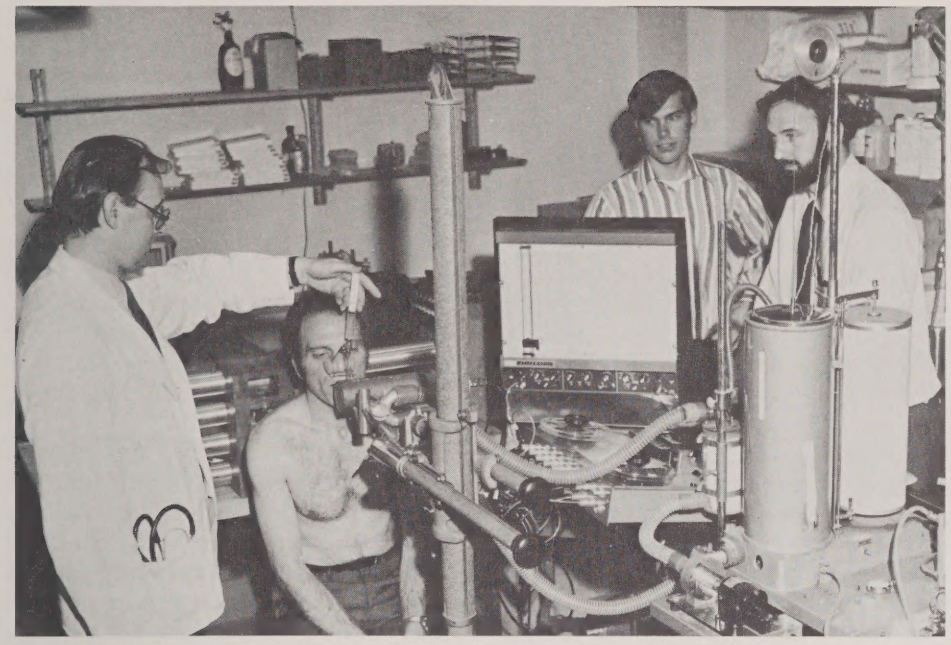
Subsequently he stopped losing weight. His episodes of fever ended, and his hacking cough abated. He soon returned to his job as a house painter.

Now, a little more than a year after surgery, he continues to do well.

The radioactive gas tests which decided doctors on the proper course of treatment for Michael are carefully controlled.



William Bucelewicz, cyclotron technician, at controls.



Dr. Barry Levine of MGH undergoing safe, painless nitrogen$_{13}$ test for research purposes. Others in picture are Dr. Reginald Greene, left; David Lee; and Robert Baker, Ph.D. Series of pictures on page 6 shows speed at which the gas spreads through lungs.

He could feel no discomfort from the tests. What makes the radioactive gases so harmless is the speed with which they lose their radioactivity.

During all tests, Robert Johnson, MGH Radiation Safety Officer, carefully monitors the amount of radioactive material used.

The Atomic Energy Commission regulates the amount of radioactive substances that can be used for a patient. To provide a further margin of safety, the hospital restricts doses to one fifth this amount.

The CO_2 and other radioactive gases used for patients or research are produced to order. They are piped up from the cyclotron in the basement of the Cardiopulmonary Building to the patient upstairs.

An operator in the basement controls the flow of radioactive gases. He sits at a panel shielded by a four-foot wall of concrete and a four-foot water window.

One of the two rooms on the other side of the wall contains the cyclotron itself. Its main component is a 40-ton steel magnet.

The MGH bought its cyclotron with funds from the National Institutes of Health and from private donors.

The presence of a Physics Research Laboratory under the direction of Gordon L. Brownell, Ph.D., made the use of one possible.

After a hesitant opening in April of 1967, the device required various refinements over the next 18 months. Once debugged, it has provided virtually trouble-free service over the past year and one half.

The device cost under $200,000. It requires about $30,000 a year in salaries to operate it. Materials add only another few hundred dollars a month.

Most of the radioactive materials manufactured by it are not available commercially. Those that are prove extremely expensive.

Adding A Third Dimension

A device known as the MGH Positron Camera is adding a third dimension to cyclotron studies.

Dr. Gordon L. Brownell, Director of the Physics Research Laboratory, first devised a positron scanner in the 1950s. Since then, the laboratory has continued the development of a series of more and more sophisticated ones.

The second-stage device is now in use for brain scanning in the hospital's Neurosurgical Service.

The MGH Positron Camera is the third stage. Under the direction of Charles Burnham, Associate Applied Physicist in the Physics Research Laboratory, the laboratory designed and constructed the camera specifically for use with the MGH cyclotron.

Dr. Bernard Hoop, Associate Applied Physicist in that unit, explained:

"The camera permits a three-dimensional moving picture of the way the radioactive chemicals produced by the cyclotron disperse in the body.

"When you take a chest X ray, you produce a two-dimensional 'shadow' of a three-dimensional object. This you do by 'shining' a beam of X rays on a patient."

The MGH Positron Camera produces pictures of the radioactive material within the lung or other organs. In addition it permits the physician to focus at different depths within the lung to obtain a three-dimensional picture of how the lung is functioning.

"This is extremely important," said Dr. Homayoun Kazemi, Chief of the Pulmonary Unit. "You can focus down on a very small area within the core of the lung."

The lung's size is what makes knowledge of the depth so important. Made one-dimensional, the surface area of the lungs of an adult male would cover a tennis court. Each lung has 300 million gas-exchanging units.

Each unit possesses all the requirements for gas exchange. It has blood flow and gas flow. It also has mechanisms to adjust blood and air flow. These mechanisms make the lung aware when flow to one part of it changes.

If air flow to one portion of a normal lung is reduced, blood flow automatically falls off to about the same level. Not so in a diseased lung.

Ordinary tests merely demonstrate the overall result of this malfunction. Such a summary shows only the balance of how the normal gas-exchanging units as well as the millions of diseased ones are working.

With the use of radioactive gases from the cyclotron, the doctor can see what is happening in each of roughly eight sections of the lung. But each section still contains millions of cells. A report on one section is thus a report on the overall condition of many million units.

"The positron camera," Dr. Kazemi said, "should permit us to look at far fewer units at one time. That would be a major step in understanding disease processes at that level. This is then the potential of the positron camera and its ability to focus at different depths within the lung."

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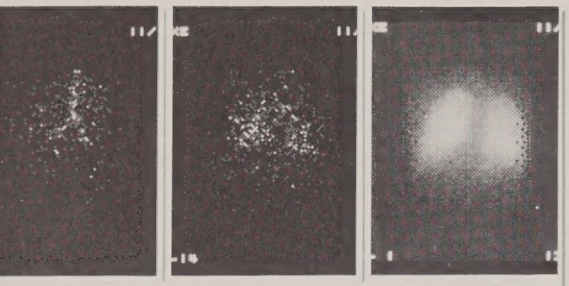

Unique photographs demonstrate how quickly the combination of radioactive isotopes, positron camera, and computer acquires information. At left, one tenth of a second after patient inhales radioactive nitrogen13 the camera catches the gas going down the windpipe and two bronchi which branch out below it. Another tenth of a second later (center photo) the gas has reached the alveoli, tiny units where gas exchange takes place. At right, just one second after the patient inhaled, the gas has spread throughout his lungs.

ADDING A THIRD DIMENSION

(Continued from Page 5)

This ability depends on the fact that the radioactive chemicals made by the cyclotron emit particles known as positrons and decay quickly. At the point of decay in a patient, two radioactive particles called gamma rays are emitted. They travel in opposite directions.

"The principle," Dr. Hoop said, "is that if one detects the two gamma rays simultaneously, one knows exactly the line in the body along which that decay took place."

The MGH Positron Camera was designed and constructed with Atomic Energy Commission funds. There are also a few other positron cameras in existence.

"The MGH device," Dr. Brownell said, "should permit us to obtain good pictures 100 times faster than any other existing device."

It is this capability which hospital scientists expect will make the MGH Positron Camera especially valuable in use with patients. To deal with this rapid compiling of information, the camera is linked to a computer in the Physics Research Laboratory.

Two other cameras or scanners are connected to the same computer which was bought with National Institutes of Health funds. One is that which provides information for the Neurosurgical Service; the other, for the Radiology Department.

"This combination of computer, special cameras, and cyclotron," Dr. Hoop said, "provides a unique opportunity to diagnose a number of patient problems and to delve into questions of medical science which have thus far been difficult to approach."

Out of More Efficiency, A New Challenge

Increased hospital efficiency has created a significant challenge for hospital dietitians.

Because of modern medicine, many patients survive illnesses and accidents that once were fatal. Often these patients must learn to manage their own medical care, including modified diets, at home.

The push for earlier hospital discharge comes from the activities of the MGH Utilization Review Committee, a group organized as part of the Medicare requirements to prevent overlong hospitalization of patients. At the MGH this committee has advanced beyond the basic requirements.

"With utilization review the patient must leave the MGH as soon as possible and get into a less expensive facility," said Miss Annie Galbraith, Associate Director of the MGH Dietary Department.

"One nursing home with 200 beds has the services of a dietitian only four hours a week. The patient should be taught here where there is a much larger concentration of people who have the information he needs to know.

"We should do more reaching out," added Miss Galbraith, "but we do not have very much of a mechanism for seeing how the patient is really doing at home."

The MGH Bunker Hill and Chelsea Health Centers provide sources for reaching out and teaching proper nutrition outside the hospital. The nutritionists there offer services in diet counseling for weight reduction, anemia, feeding problems, prenatal counseling, a nutrition referral system, a teen weight-reduction program, and food-education programs. One dietitian also acts as an adviser to the Head Start program and commodity-food programs in Charlestown.

Nutritional education also plays a major role in the Nutrition Clinic, an outpatient facility which sees patients on referral from other MGH clinics or staff doctors. Fifteen to twenty patients are seen daily. Overweight plagues many of these outpatients, but a variety of dietary problems is handled by the three dietitians and the dietetic interns.

Education of the patient in correct long-range nutritional goals is often a difficult task in the face of rising food costs, a patient's cultural tradition for certain types of foods, and poor eating habits.

"You're working for behavioral change," said Miss Galbraith. "This is a terribly difficult goal to accomplish with patients. We have very discouraging results over a long term, particularly with weight control."

Teaching of patients, personnel, and students in allied health fields is an

Miss Alma Blake, Unit Coordinator in the Nutrition Clinic, teaches an outpatient proper nutrition using models of food portions.

underlying theme throughout the Dietary Department.

"Dietitians are teachers always," said Mrs. Lyn Fleming, a registered dietitian on the MGH Nursing School faculty. "Not always in a classroom setting, but we are constantly teaching."

The dietetic interns have an opportunity to teach nutrition to elementary-age youngsters in the Boston Public Schools after they spend three days in a teaching workshop sponsored by the New England Dairy Council. The Dairy Council is the educational branch of the American Dairy Association. Its sole aim is nutrition education.

Later in the internship year the students assist Mrs. Fleming in a teaching session of the student-nurse nutrition course.

"Dietetics also reflect the complexity of the medical care that is given in a large teaching hospital such as the MGH," said Miss Louise Hatch, Director. "Over two thirds of our patients are on a modified diet."

The Dietary Department has become far more sophisticated in the recognition of nutrition as an integral part of medical treatment since 1907, when the first dietitian was employed at the MGH to instruct nurses in "invalid cookery."

Today the organizational pattern is a sphere with a multitude of important functions radiating from the patient. A coordinating committee (Miss Hatch, Miss Galbraith, and Miss Mae Dozier) guides the 34 professional dietitians, 27 dietetic interns, and a nonprofessional staff of 300 to meet the needs of the MGH's 1,090 inpatients and the people who care for them.

Operating costs totaled over $5½ million last year, 9 percent of the total hospital budget. Over 7,000 meals are served daily to patients, staff, personnel, and visitors.

Over 350 gallons of ice cream (made in the MGH) and one ton (1,000 loaves) of bread (also prepared in the hospital kitchen) are consumed each week.

The Dietary Department is the source of a variety of services to the hospital: the major one is providing patients with the proper nutrition for their particular condition while they are hospitalized.

Each of the patient-care areas of the hospital is staffed with graduate dietitians. Their jobs often encompass tripartite duties: administrative, clinical (or therapeutic), and teaching.

Larry Stevens, Head Baker, oversees James Richards making sweet rolls in the bake shop. All bread and baked goods are made daily in the hospital.

The dietetic unit coordinator schedules and supervises all dietetic personnel on her service, and often directs the day-to-day instruction of the dietetic interns on her unit.

One area where the services of a dietitian play a crucial role in patient care is the Mallinckrodt Research Ward. Her work in the ten-bed ward involves accurate weighing of diets of chemically known composition for metabolic studies.

These research studies, conducted by MGH staff physicians, depend in large part on the meticulous diet care and instruction given the patients by the dietitian.

The purpose of one recent study was to determine the iodine content of food. Bread baked within the hospital contained less iodine than any commercial brands.

The dietitians, wherever their area of service in the 1,090-bed hospital, are responsible to the central Dietary Department. The main administrative offices recently moved into pleasant new quarters in the Gray basement. Adjacent to the offices is a new Dietary Service Center where $1½ million worth of food is received annually.

"We are dreaming," said Miss Hatch, "that this move is just step one of a plan that will give us an opportunity to expand the dining room and ultimately change the patient service from this decentralized pattern with 33 pantries to a semicentralized system. We would have fewer finishing kitchens, and this would help service to patients."

In a decentralized pattern such as the MGH presently uses, food is prepared in two main kitchens, taken to the floors in electrically heated food carts, assembled in small serving kitchens in the units, and served to patients.

In a semicentralized system, most of the food is prepared and plated in one location before delivery to the floors. Far fewer pantries would be needed under this system, which would allow for a higher standardization of meal service.

Food safety is an integral part of dietetics in the MGH.

"We are very much involved with the provision of safe food," said Miss Hatch. "This also has to do with convenience items which are increasing in number but are very difficult to evaluate in terms of bacteriology."

The department is evaluating the prepackaged "convenience foods" for nutritive content, quality, and cost.

Although the MGH has not begun using convenience products, a convenient new process has lent itself to efficiency in food service during the last year: computer application to patient menus. The computer output includes tallied menu items arranged on worksheets for each food-production area, listing of foods for each floor in the hospital, and a daily dietary census.

The new menu resembles a typical "do not bend, fold, or staple" computer card. One cyclical menu (based on the four seasons) is used for all patients and allows for an expanded menu selection.

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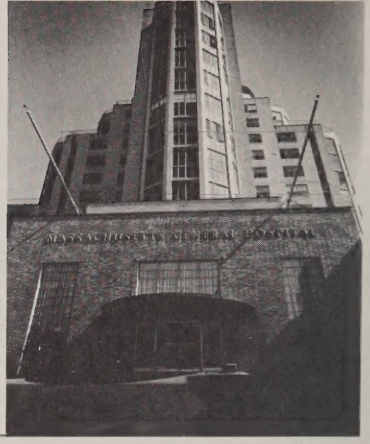


Brotherhood: A Precondition for Survival

(Continued from Page 3)

features of human culture, even more remarkable are the diversities of the behaviors that cultures shape and are shaped by.

If we explain the murderous raids of Brazilian Indians on the basis of an inborn aggressive instinct, we shall have to invent a complicated theory of repression, reaction formation, and sublimation to account for the peacefulness of the Eskimo.

Would it not be far more parsimonious to begin with the assumption that men are by nature neither aggressive nor peaceful but rather are fashioned into one or another as the result of a complex interaction between a widely but not infinitely modifiable set of inherited traits and the shaping influences of the biological environment, the cultural envelope, and individual experience?

However wide the range of possible behaviors man can exhibit – evidenced by the comparison of one society with another – the task of developing adaptive attributes is very different when radically changed behaviors are required within an individual lifetime rather than over the history of a people.

The question now becomes, not how malleable is man, but how much change can a man undergo and still remain whole?

If we are to enable our children to cope with a world whose present shape we barely comprehend, and whose future configurations we can only guess at dimly, then we are embarked on an enterprise that is at the very keystone of the sciences of survival.

The extraordinary dependence of the human young upon adult care and caring provides both an unparalleled opportunity for mental and emotional development as well as a period of vulnerability to ruin by neglect. There are major gaps in our knowledge of this early developmental sequence.

We do not understand genetic variability sufficiently well to fashion optimal environments for each child, but surely this does not mitigate our failure to provide at least those general requirements shared by all.

Our task is less the assimilation of solutions that have been successful in the past than helping our children to acquire attitudes and sets for problem-solving that will enable them to meet undreamt-of challenges to their capacities.

Our understanding is the least adequate to the task of encouraging the development of humane values based upon the recognition that mankind is a single species. *The idea of brotherhood is no contemporary discovery, but what is special to our times is that it has become a precondition for survival.*

By acting on behalf of our species, we become men and women. In the world in which wars rage, in which repressive governments subjugate their peoples, in which the pursuit of personal affluence ravages an environment that must be shared by all, there can be no neutrality.

The study of man takes its meaning from involvement in the struggle for human betterment. Struggle it is and will be. Privilege does not surrender easily; false belief is not readily dispelled.

The optimism I urge is not the self-comfort of reading history as a saga of progressive liberation which will one day be complete.

It matters, and matters dearly, to Vietnamese and to Pakistanis, to Americans and to Canadians, whether that day comes sooner or later. Whether it comes at all is not determined by history but by the men and the women who make history.

"The extraordinary dependence of the human young upon adult care and caring provides both an unparalleled opportunity for mental and emotional development as well as a period of vulnerability to ruin by neglect."

MGH News

Vol. 31 No. 2 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS February, 1972

Pilfering From the Family Album to Aid the Patient

A Subtle Revolution in the Health-Care System

A subtle revolution in the delivery of health care is quietly sweeping across the country.

Interviews with health professionals have shown that pockets of change are already appearing in every section of America.

What has helped to keep this development out of the public eye is the unusual source of the revolution: an overhaul of the ancient system of writing up a patient's medical record.

"Patients never knew much about the old system," one observer commented. "Therefore it's not surprising that even this major break with the past is going unnoticed even though it is often resulting in much improved care."

With minor variations, medical schools have taught the traditional method to every student. Included is a chronological account of the patient's present illness. Past illnesses are briefly described as are the results of a physical examination.

The doctor's diagnosis concludes the record. Occasionally a brief plan of treatment also makes an appearance.

Several years ago a Cleveland physician (now at the University of Vermont) named Lawrence L. Weed pondered the contrast between this method and the one used to keep research laboratory records. In the laboratory he was expected to produce a systematic, logical account. When he stepped from his test tubes to a patient-care area, he would face the traditional medical record: haphazard in content and randomly organized.

Finding a key fact in the six-inch-thick record of someone hospitalized for several months could take hours. Important problems could even get lost. It was easy to forget even a major one, if a patient has many problems – and many persons do.

When several physicians in a clinic or hospital treated the same patient, the difficulties became compounded. Then it was often a challenge for one specialist to trace what another had previously learned or accomplished.

Other major problems also could result.

As Dr. Weed himself expressed it in a talk at the MGH: "The practice of medicine is the medical record, and if it is disorganized and confused, so is the practice of medicine."

(Continued on Page 4)

Miss Carol Nania, RN, snaps color photograph for insertion into experimental medical record.

Logan Airport Medical Station, the original home of Telemedicine, may spawn another new dimension in patient care.

Like the idea of practicing medicine over television, the new concept is also visual.

For the past four months, nurses at the MGH's medical station have been raising havoc with the traditional way of keeping medical records. Under the direction of Dr. Kenneth T. Bird, they have been making those records visually oriented.

They have been snapping color photographs of everything from infected toes to severely cut heads and inserting these photos into the records. Wherever desirable, beside these pictures sometimes appear snapshots from the patient's family album.

Photography represents the first infant step in what Dr. Bird envisions as the medical record of the future. Tape recordings, a sketching device, and the typewriter form some of the other elements.

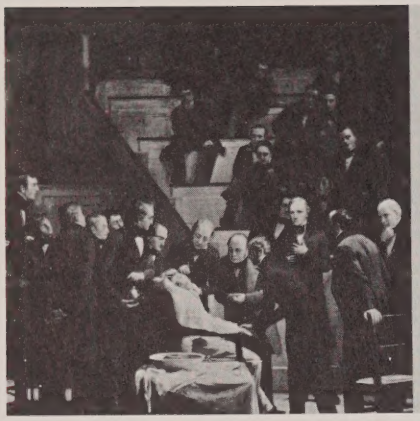
Dr. Bird plans to integrate them into another revolutionary innovation called the Problem-Oriented Medical Record (other page 1 story).

He has labeled the system PROVE for Problem-Oriented Visually Enriched Medical Record. Through the use of illustration, PROVE would correct what Dr. Bird believes is a glaring deficiency:

"Vision is not properly utilized in records. The records system of America today is largely word oriented, and unfortunately it's in the worst mode – handwriting.

"Anybody who has ever tried to

(Continued on Page 8)



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EDITORIAL:

The Wheel Reinvented

Like the planet itself, good ideas never die. The philosopher, with good reason, wonders how many times the wheel was invented, or fire was discovered. Now a wheel of new composition has rolled into view in the front-page story about the Problem-Oriented Medical Record. One would be rash to call the new procedure a regurgitation of the End-Result System introduced to the medical world 71 years ago at the MGH. Dr. Lawrence L. Weed has independently devised a much more comprehensive program.

Dr. Ernest A. Codman's End-Result concept was surely an idea seven decades ahead of its time. Yet it would be wrong to believe the End Result perished. Through Dr. Codman's zeal it became an accepted way of dealing with clinical case follow-up records at the MGH Tumor Clinic. A modified form persists today not only at the MGH Tumor Clinic but also at many others. Unfortunately, however, Dr. Codman's system has enjoyed only fragmentary success in other areas.

Now this all seems likely to change. The Problem-Oriented Medical Record looks like a sufficient leap forward to offer the lure of improved patient care. However, even many of its staunchest advocates recognize a need for improvements in this new system. A refinement here, a modification there, will enhance both its usefulness and its acceptability. Many institutions will want to adapt it to fit their individual needs.

Even with these alterations the Problem-Oriented Medical Record will find slow acceptance from many practitioners reluctant to try new methods. One of the ironies of the return of the wheel to the MGH is the source of its renaissance. It is the hospital's Medical Service which has welcomed the idea. As a surgeon, Dr. Codman had most of his success with his surgical colleagues. A medical man, Dr. Weed is finding acceptance from *his* own colleagues. One feels confident, though, that the young people in medicine today – be they surgeons or medical men – will eventually force some form of the Problem-Oriented Medical Record on the entire profession.

Closely related to this discussion is the experiment going on at the MGH's Logan Airport Medical Station. The introduction of visual and eventually even auditory aids into the medical record sounds like an intriguing development. Still in its infancy, that pilot project will demand a long study before a thoroughly practical system of implementation evolves. If one does, however, the resulting combination of an improved Problem-Oriented Medical Record and a visually oriented one should prove worth the effort.

He Stood 8 Feet Tall But Was Invisible

Every millimeter on Ernest Amory Codman's 6-foot, 2-inch frame was carved from stubborn New England granite.

On some days, Dr. Codman acted as though he stood 8 feet tall. But most of the time his colleagues behaved as though they could not see him.

Little honored, even in retrospect, he nevertheless towers in achievement over most of those who derided him. He forced the MGH to pioneer by extending the new practice of specialization in surgery. He himself pioneered in several ways including his early use of X rays.

The obsession of his life, however, was what he called the End-Result System. Dr. Codman himself described it as "merely the common-sense notion that every hospital should follow *every* patient it treats, long enough to determine whether or not the treatment has been successful, and then to inquire, 'if not, why not?' with a view to preventing similar failures in future [sic].

"My chief [at the MGH], Dr. F. B. Harrington, and I had been applying this plan practically to our service since 1900. We had found that this routine tracing of every case, interesting or uninteresting, had brought to our notice many things in which our knowledge, our technique, our organization, our own skill or wisdom, and perhaps even our care and our consciences, needed attention."

His system, complete with cards and charts, bears similarities to the "new" Problem-Oriented Medical Record (story on page 1). There are differences too, improvements such as the modern method's stress on problems instead of disease.

Dr. Codman's idea turned into an obsession in the summer of 1910 when he was attending a meeting of the Royal College of Surgeons in England. One day he and Dr. Edward Martin of Philadelphia were bouncing back to London in a hansom cab. Dr. Codman described his concept, and Dr. Martin gave it wings.

A small circle of surgeons attending the surgical meeting were thinking of starting an American College of Surgeons. Dr. Martin seized on the End-Result System as a crusade to build

the new college around. He told Codman the system was more important than the college itself:

"The tail is more important than the dog," Dr. Martin said, "but we shall have to have the dog to wag the tail."

With Dr. Codman a founder, the American College was to become a reality in 1913. So was its campaign to encourage hospital surgical departments to use the End-Result System.

But in 1910, as always, Dr. Codman was impatient. He decided that his junior status in the MGH hierarchy would impede efforts to spread the system there.

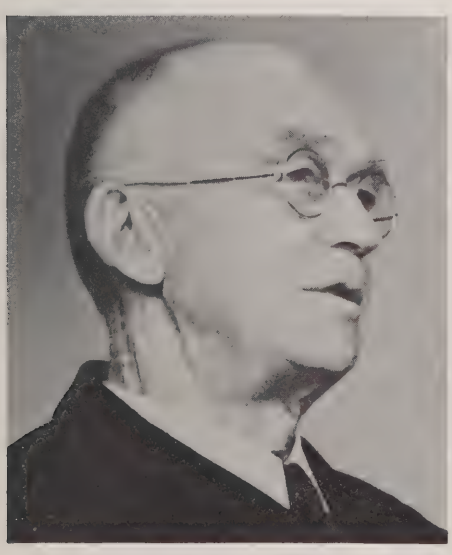
Within a year he chose a bold course. He started the tiny Codman Hospital on Beacon Hill, just a few hundred yards from the MGH. If he could not change the MGH overnight, he could shape the Codman Hospital to his liking!

His hospital adopted the End-Result System.

At the same time his appointment at the MGH enabled him to continue preaching his dogma. He cajoled his MGH clinic to pioneer the movement.

"I hoped," he later wrote, "that the MGH might become the example to which to point as a demonstration of the practicability of using this system. It did to a great extent, and I was able to use it after the campaign [of the American College of Surgeons] began."

Dr. Codman started preaching his dogma with fervor typical of his grandfather who had been a militant Congregationalist minister. In Philadelphia and elsewhere the doctor challenged his medical audiences. He harangued his readers in books he wrote and gave away at considerable expense to himself.



Dr. Ernest A. Codman

One of these, *A Study in Hospital Efficiency,* bears a dedication to Richard C. Cabot, one of the most illustrious names in MGH history:

"Because I respect his motives, admire his courage and energy, but heartily disapprove of some of his opinions and methods, for he seems to want to reform the bottom of the profession, while I think the blame belongs at the top."

Dr. Codman was determined to promote his cause through revolution rather than evolution. In 1914 he resigned from the MGH "as a protest against the seniority system of promotion, which was obviously incompatible with the End-Result Idea."

The trustees accepted his resignation. That same day, he wrote them again, seeking appointment as Surgeon-in-Chief "on the ground that the results of my treatment of patients at their hospital during the last 10 years had been better than those of other surgeons."

The trustees never replied. Yet Dr. Codman felt vindicated:

"It was not long before the seniority system was dropped, and a portion of their budget became devoted to a Follow-up System."

Not even the growing army of colleagues he was alienating could have predicted his next move. It started innocently enough with an invitation to attend a discussion of hospital efficiency. As Chairman of the local Medical Society, he arranged the meeting at the Boston Medical Library.

Unable to obtain the speakers of his choice, he ensured a crowd by substituting people like Mayor James Michael Curley. The audience included doctors with some of the best-known names in Boston medicine.

The speeches over, Dr. Codman hurled his thunderbolt. He unveiled an eight-foot cartoon representing rich patients as a head-in-sand ostrich laying golden eggs. The cartoon asked whether these people would continue to pay handsome medical fees if they knew the end results of hospital treatment.

After the audience recovered, some members stormed out. Dr. Codman fell into disgrace, and he was asked to resign as Chairman of the local Medical Society.

Despite the storm, Dr. Codman retained the loyalty of many friends. The MGH was maintaining its End-Result cards and follow-up system and the practice of surgical specialties there was continuing.

"I heard more and more signs of appreciation of what I was trying to do," Dr. Codman recalls of the ensuing year. Then World War I struck, and with it, disaster. When he returned from the service, he found his private hospital closed and in debt.

He drifted into organizing a Registry of Bone Sarcoma (cancer): "My dream was that this one disease could be used as an example of the inadequacy of our present methods, and that some day the records would serve to demonstrate the value of the End-Result System in hospital organization."

Later he regained his MGH platform when the hospital appointed him a Consulting Surgeon with operating privileges.

A few lines from the autobiographical preface to a medical book he authored could serve as an epitaph:

"Although the End-Result Idea may not achieve its entire fulfillment for several generations, I hope to be as content when dying as any soldier on the battlefield, who, although he may have fought for quite the wrong side, feels the glow of patriotism; or as many an old financial baron, breathing his last in his four-poster, convinced that he has left his children protected from a wicked world.

"Honors, except those I have thrust on myself, are conspicuously absent on my chart, but I am able to enjoy the hypothesis that I may receive some from a more receptive generation."

Woof! Woof!

A seminar on the Problem-Oriented Medical Record illustrates the growing popularity of the subject.

Given on the MGH campus, the course had nearly twice as many applicants as the 150 seats permitted. They came from around the country and included many nurses and record librarians as well as physicians.

What really surprised the MGH-Harvard faculty, though, was the appearance of two veterinarians.

"I hope their patients benefit," one doctor observed.

Revolution Through Common-Sense Approach

(Continued from Page 1)

Confronted with such thoughts, Dr. Weed decided to innovate a more logical system. The result is the "Problem-Oriented Medical Record."

Unknowingly what Dr. Weed had devised was similar to a method pioneered 71 years ago by an MGH surgeon (story on page 2).

Dr. Weed's system follows common sense.

"That's the striking thing about it," said Dr. John Burnside, former MGH Chief Resident in Medicine. "The most frequent comment you hear from people who use the system is, 'Why didn't I think of that?' It's so full of common sense. And it makes sloppy treatment very difficult to hide.

"It's doing at the bedside what the people in the laboratory have been doing for years. They have a research problem, and they lay out a plan for attacking it. They have some rational way of recording their data, and at the end they list a conclusion."

The heart of the Weed system is to list the problems in a striking way. A problem is anything that stands in the way of the patient's good health. It could be a disease. It could be a family problem or even a difficult job.

To manage it might require a social worker, dietitian, or nurse in addition to a physician.

The physician numbers the problems. For easy reference he maintains a master problem list in the back of the medical record. A glance at this one page tells him, or any other physician, all the problems the patient has or has had over a lifetime of care. Using the old method, the doctor usually ends up relying on his memory.

"You just cannot remember all of the pertinent information," Dr. Burnside said.

The most important requirement of the new technique is for the physician to state the problem at the level he understands it. A good diagnostician will follow that procedure anyway. Yet the old medical record does nothing to discourage the tendency to guess.

Dr. Stephen E. Goldfinger, an MGH staff member who is Director of Community Programs for the Department of Continuing Education at Harvard Medical School, explained this pitfall:

"There is something absolutely dazzling about the marvelous clinician who comes up to a bedside and with one piece of patient history and two bits of physical examination he reaches an instantaneous diagnosis. He just says, 'That's the cause of his illness.' And 98 percent of the time he's right.

"The trouble is that this is the physician whom all the medical students want to emulate. Very few of them will ever be that good, but they may try to come up with the right diagnosis on insufficient evidence.

"What the new method does is to make them look at things in a systematic way. Although they may not have the right answer immediately, they will make fewer mistakes because they will approach the problem systematically."

Under the old system, a physician might be tempted to write something like, "abdominal pain probably due to ulcer." Even if incorrect, the diagnosis of "ulcer" might then become a permanent part of the patient's record.

In the Problem-Oriented Medical Record, the doctor is required to write "abdominal pain" until he has enough evidence to indicate that the patient actually has an ulcer.

The evidence is written down in the first step called "data base." Next comes the problem list. After a problem is listed, the doctor enumerates plans for the proper diagnosis, treatment, and patient education.

The patient-education category is another innovation. Good physicians have always tended to teach their patients how best to take part in their own care.

By incorporating patient education into the medical record, however, the problem-oriented method demands this of the forgetful physician as well.

At MGH's Medical Clinic C, headed by Dr. James Dineen, the health-care team experimentally carried patient education a bit further. The team prepared for each patient a little card which included the problem list and the patient's medications.

If he later appeared in any hospital's emergency ward with some complaint, he could show the attending physician his card. In a glance the doctor would then have some very helpful background information.

"Too often in the past," Dr. Burnside said, "a patient would come in and tell you he had been hospitalized but have no idea what exactly had been wrong with him. By making him a participant in his own care, we find him uniformly much more cooperative in taking care of himself."

If a physician decides that a given patient should not be told his diagnosis, the doctor writes that fact prominently into the medical record. This precaution reduces the likelihood of another physician unwittingly disclosing the diagnosis.

A by-product of the attempt to make the medical record more scientific is a breakdown of the health-care process into steps frequently represented by four boxes (shown on this page).

This dissection of delivering care provides a guideline for everyone involved in the care of the patient.

"This is a simple, beautiful little road map of what happens in the health-care process," Dr. Dineen said.

This map lends itself to use by allied medical personnel.

"It makes physicians realize," Dr.

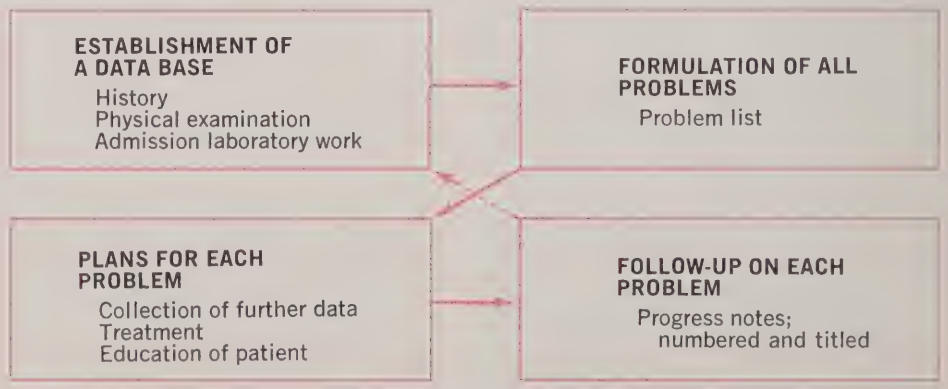
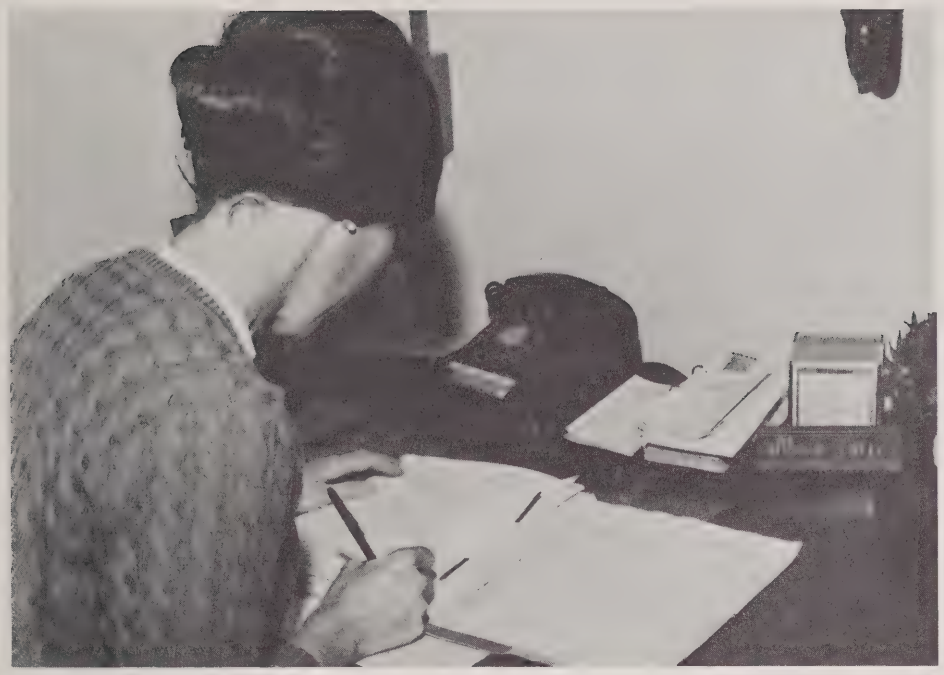


Diagram shows the four basic steps used in the health-care process and the Problem-Oriented Medical Record.



Nurse clinicians like Sharon Mitchell, RN, find the new system indispensable.

Dineen continued, "that the thing they're uniquely trained for is not to gather data, and not necessarily to do all the follow-up. What they are uniquely trained for is to analyze the data, decide what the true problems are, and draw a plan of attack. They can then turn over to their nurse or nurse clinician the task of putting the plan into action and getting a lot of follow-up information. The doctor then reanalyzes the data and the progress. The road map is just invaluable in terms of the expanded role of allied health personnel."

Dr. Goldfinger confirms that this technique which includes "data flow sheets" that outline a patient's progress has greatly helped his own use of nurse clinicians.

"It's one of the most exciting things for me to have a nurse clinician in our clinic see a patient with diabetes or high blood pressure once a month. I can see the patient at six-month intervals and just by looking at one sheet of paper I know precisely how that patient has done those six months. It is just enormously helpful. More so in the clinics than with in-patients."

Nurse clinicians like Sharon Mitchell, RN, find the new system indispensable.

"When you convert a record that was done the old way to the new system," she said, "it takes a good deal of time and discipline. But the saving in time and improved patient care that you get later on are incredible."

The Problem-Oriented Medical Record came to the MGH in 1970.

Dr. Dineen had observed a variation of the Weed system in Hampden Highlands, Maine. There Drs. John C. Bjorn and Harold D. Cross have adapted the Problem-Oriented Medical Record to their private patients.

With Drs. Goldfinger and Burnside, Dr. Dineen pushed for its introduction at the MGH. In July 1970, the system began in Medical Clinic C. Dr. Burnside then inaugurated it throughout the medical service in January 1971.

All interns and residents have thus used the method for just over a year. The medical students have taken to it as avidly as the house staff.

"The acceptance of his way of doing things," Dr. Burnside said, "is sort of inversely proportional to the number of years out of medical school."

The system is slowly winning converts among the older physicians too. Services such as psychiatry hope to train residents in it. Among its other virtues this technique facilitates the training of doctors.

Dr. Dineen expects use of the Problem-Oriented Medical Record to spread:

"One of the reasons why this system is one of the biggest things to come out of the 60s is that you take all the hot ideas in medicine now, and this system subserves them beautifully. New techniques like computerized medical histories [*MGH News,* June 1968] just dovetail beautifully.

"I buy the theory that if the system is as good as I think it is, it will sell itself eventually."

Dr. Goldfinger agreed, citing his own experience as an example. Like many practicing doctors wedded to the old way, he thought that a good clinician did not need the new.

"I really started to use it," he said, "when my secretary became overloaded, and I couldn't dictate for a couple of weeks.

"When I was forced to sit down and write it, the new method was easier for me to adapt to. Since that time I've been writing my notes and doing it in a problem-oriented way.

"I find my notes are better organized now. It has been said that an idea is no clearer than one's ability to express it verbally. This method forces you to sharpen your thinking and also reveals to you the limits of your own knowledge."

Dr. Goldfinger calls the Problem-Oriented Medical Record an idea whose time has come:

"Ten years from now as we look across practices in communities as well as universities, most people will be using some form of it."

He cautioned, though, that a slavish adherence to the Weed system might retard its acceptance:

"Like all good ideas it is something that can be built upon, and changed. And although it will probably be taught at every medical school within the next few years, the teaching will differ from school to school. Variations will depend on who the zealot at a particular school is who is doing the teaching and on the modifications he has made."

Dr. Dineen warned against looking to the Problem-Oriented Medical Record as a panacea:

"It's not an answer for everything, but a logical beginning. Introducing it has problems, and initially it has an investment of time. You don't get dividends on it until you're seeing a patient for the second, third, or fourth time around.

"By itself, it doesn't guarantee good medicine. The doctor has to guard against treating the patient as six problems that just walked through the door."

The Name of the Game? The Patient

"The whole name of the game is the patient," said John Webb, Director of the MGH Pharmacy. His philosophy is reflected throughout this large, vital department, whose scope extends much further than simply filling drug prescriptions.

The 26 registered pharmacists in the department are professionals who are forging closer links to become part of the total health-care team.

Under the umbrella of "pharmaceutical services" in a large teaching and research hospital like the MGH, fall diverse operations. Among them are clinical training for pharmacy students; the manufacture and research of new drugs; supervision of the preparation of injectable solutions; computer programs to compile, analyze, and safeguard drug use; a Poison Control Center; inpatient and outpatient pharmacies; inventory of surgical instruments and prosthetic devices; gas sterilization facilities; and quality control and analysis of drugs.

Mr. Webb guides his department with an emphasis on people – the 80 professional and supportive personnel who function within the department, the doctors and nurses who utilize drugs daily, and the patient who benefits from them.

An integral pharmaceutical problem in ensuring excellent patient care in a 1,090-bed hospital is the distribution of drugs. For the past ten years at the MGH, MOSAICS has been the key word. MOSAICS is an acronym for Medication Order Supply and Individual Charge System. It is a decentralized distribution system which places all drugs in current use by patients on their nursing units 24 hours a day.

Under MOSAICS the pharmacists go out of the pharmacy and onto the patient-care floors. In this way they come into closer contact with the patient and his drug needs, act as active drug consultants to the nurse and physician, and assume more responsibility over the products they dispense.

The Pharmacy then assumes the responsibility for the stocking, dispensing, and charging of all medications on the nursing unit. In contrast, the former system might have the nurse sending requisitions to the pharmacy for each individual patient's drug order throughout the day or night. She was involved in checking her floor inventory of drugs and keeping records for charge purposes of each dose administered to each patient.

"One should not underestimate the benefit of direct pharmacist involvement to patient care," said Mr. Webb. "Drug recalls are quicker and easier to follow up when the pharmacist routinely visits the floors.

"It may be demonstrated that patient care is improved since the pharmacist checks prescribed doses for all drugs. In reviewing the overall medication program he is better able to see any physiological or pharmaceutical incompatibilities."

Pharmacists now routinely visit pediatric units in the Burnham Building, floors four and five, to facilitate the ordering and handling of intravenous drug administration for Project CURE (Care Unit Research and Evaluation).

Since June of 1970, Fred Jones, former Assistant Director of the Pharmacy and now Assistant Director of the Laboratory of Computer Science; Kenneth Rosenthal, Chief of the Inpatient Pharmacy; and Siraj Shamsi, a registered pharmacist, have worked closely with the Laboratory of Computer Science on this project.

CURE was originally designed to promote direct communication between physicians who ordered intravenous injections (IVs) and the pharmacist who fills the order. The project now provides accurate drug profiles and cross-checks for drug incompatibilities on pediatric patients receiving drugs intravenously.

Under Project CURE, IVs are mixed and dispensed in the Pharmacy, where the pharmacist can maintain close quality control and sterile procedures. This relieves the busy physician from the task of mixing IVs on patient floors.

Providing a double check for drug compatibility and dosage accuracy, CURE's computer in the inpatient pharmacy carries a total up-to-date listing of all patients on Burnham 4 and 5 who are receiving intravenous drugs. After the pharmacist attends rounds with physicians and nurses on the floor, he enters into the computer drug data for each patient.

The computer will check the drug for incompatibilities with other medications the patient may be receiving and will monitor over- or underdosage. In case of dosage error the computer will alert the pharmacist that the drug should be double-checked with the physician before it is made up and given to the patient.

Mr. Shamsi is quick to point out that the computer's information is always dependent upon the physician's

Alfred Fiore, head of Pharmacy Research and Development (right), watches Tommy Mooncai, Registered Pharmacist, perform analysis on a drug. All pharmaceuticals undergo strict quality control for accuracy and potency during and after manufacture.

decision on individual treatment. (Computer output is based on standard data drawn from the hospital formulary, pharmacists' and pediatricians' recommendations, and an intricate drug incompatibility chart worked out by Mr. Webb.) In turn, the decision may demand specialized drug therapy.

If the computer checks through the drug, a teletype attached to CURE's computer makes out labels for the drug's record kept in the pharmacy, the IV bottle, and for billing. It also provides a daily log sheet of all patients, containing their location, the number of orders and dose times, and a system summary of what drugs patients are receiving, the number of orders written, labels produced, and the number of patients treated.

With people as "the name of the game" and the push toward total team health care, pharmacy schools are expanding the students' understanding of what drugs do for the patient.

"One of the big things in hospital pharmacy at the moment and pharmacy in general is the clinical exposure," said Mr. Webb. "Once a year for a 10-week period, eight senior pharmacy students from Northeastern come to the MGH and go on rounds with the doctors. We're saying, 'no longer think of just the drug, think of the patient because that is where the drug is going.' If you know the patient and the total treatment for his disease, then you are better able to understand what the drug is all about."

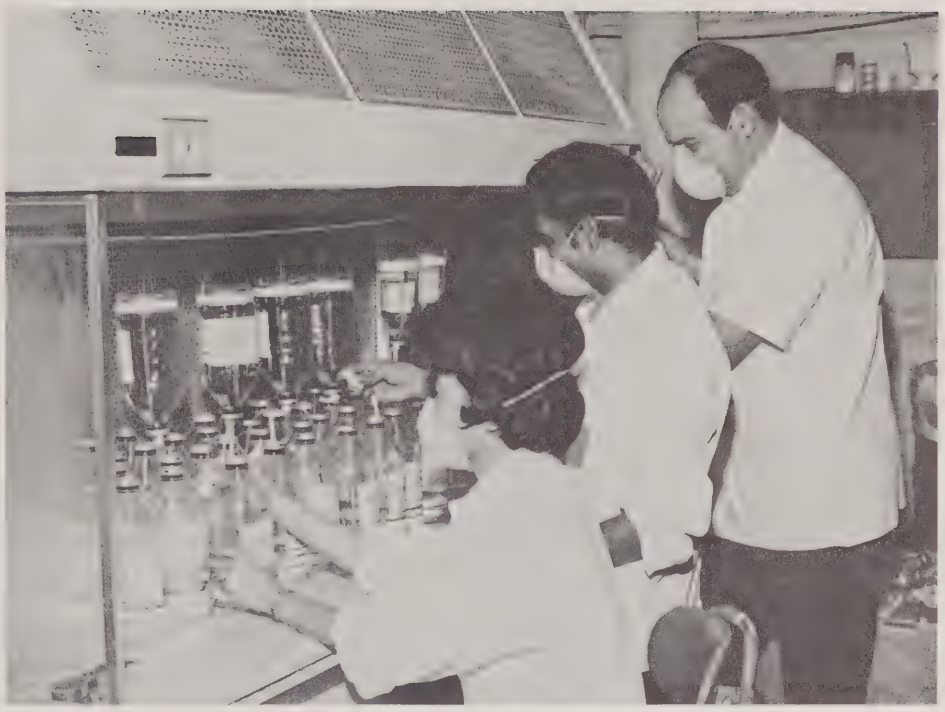
Students also work in the Ambulatory Screening Clinic and other outpatient clinics where they have direct patient contact. It has proved mutually beneficial. Often the patient's drug history taken by a student will add to the total patient history the physician assembles.

Outpatients who use the clinics may have their prescriptions filled at the Clinics Pharmacy, another branch of the MGH Pharmacy which also serves the Massachusetts Eye & Ear Infirmary.

Under the direction of Pharmacist Karl Wood, the Clinics Pharmacy was extremely active last year.

Most pharmacies do not label prescriptions with the drug name, only directions for use. As a safeguard for the patient, generic drug names are put on the labels of all medications dispensed in the hospital.

Each clinic patient's drug information is filed on a huge revolving file drum in the main pharmacy area, where it is readily available. Last year a computerized drug profile on all patients who had prescriptions filled was begun in the Clinics Pharmacy.



Aurora Santos and Jay Amin, Pharmacist Assistants, mix and seal hyperalimentation bottles under a Laminar Flow Hood. Richard Giovanoni, Registered Pharmacist and Production Supervisor, assists.

"The computer has the capability for repetitive listing," said Mr. Webb. "It lists that you cannot do certain things with drugs either because the dose is excessive, or it is incompatible, or something is wrong."

It may also serve as a safeguard against potential drug abuse.

Preventing drug abuse, medication errors, adverse drug reaction, and investigation of new drugs for patient safety are primary concerns in the Pharmacy.

"Because of our size and because basic research is done at the MGH," said Mr. Webb, "we tend to get involved with many investigational drugs. We have a formulary that lists certain drugs to be used in this hospital, and there's a committee that works at this full time. It's there to protect the patient."

The Pharmacy and Therapeutics Committee recommends the adoption or assists in the formulation of broad professional policies. It also acts in evaluation, selection, procurement, distribution, use, and safety practices concerning drugs in patient care.

One subdepartment, Pharmacy Research and Development, headed by Alfred Fiore, exercises strict quality control and sterile technique as safeguards for the patient.

The MGH is one of the few hospitals in the country that manufactures pharmaceuticals on the premises on a large scale. If a product cannot be obtained commercially, or to effect significant savings, or if an available commercial product does not meet MGH standards, this department will produce it.

The Pharmacy can manufacture capsules, injectables, ointments, suppositories, lotions, and oral and ophthalmic solutions. At all stages of preparation checks are made to ensure high quality. The final product is analyzed or assayed by a pharmacist to make sure the drug meets labeled potency.

All injectable solutions are handled by this department. The trend is now to have medications added to IV fluids in the Pharmacy under controlled conditions rather than mix IVs in areas throughout the hospital.

Hyperalimentation solutions (a high protein and dextrose mixture often called "lifeline feeding"), as well as intravenous drugs, are mixed and sealed under a Laminar Flow Hood. This hood provides a positive air flow through ultraviolet light in a partially enclosed cabinet, and allows for germ-free filling of containers. Between 1,500 and 2,000 hyperalimentation bottles are made up each month.

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A Visual Aid to Improve Patient Care

(Continued from Page 1)

read a letter from even a wife or close friend knows the problem. And the handwriting of the physician is notoriously poor.

"With the visual approach we can save hours of descriptive time, hours of laborious reading and of deciphering notes written by physicians, nurses, and all sorts of health professionals. We can save these hours if we just take discreet pictures to show the patient's appearance, his physical abnormalities, the nature of his blood smear, etc."

The present medical record is replete with descriptions of such things as a patient's blood cells. The envisioned record would replace those descriptions with color pictures of the cells. The doctor examining the record could then avoid misinterpreting an ambiguous description.

Instead of reposing in another part of a hospital, a copy of a patient's X ray might also form a portion of the medical record.

The pictures already being snapped on a trial basis give the nurse clinician or physician a visual basis for comparison. When the patient returns for follow-up treatment, a glance at the color photograph of his swollen knee makes the present size and color of the knee more meaningful.

The introduction of snapshots from the family album serves other purposes. An old picture might reveal the patient's eyes, for example, at a stage before their increased bulging led him to seek medical attention.

"You can describe all you want, but it doesn't mean much until you see a picture," said Miss Marie E. Kerrigan, RN, nursing supervisor of the Logan Airport Medical Station.

Pictures of his living quarters or place of work might disclose an environmental hazard or provide valuable information to a social worker.

One future aspect of PROVE is what Dr. Bird calls the graphic matrix. This is an ink sketch of the human body in several views. By placing such a sketch in front of a pattern of two-inch squares, the doctor can visualize the body divided into these smaller areas.

If the doctor or nurse is interested in the right eye, he would press a button in the appropriate square. Out would pop a picture of the normal right eye. Onto this the doctor would sketch whatever abnormality the patient's eye has. This sketch would take its proper place in the medical record.

"What all this should add up to," Dr. Bird said, "is improved patient care through a much more meaningful record. Displayed in proper picture form, it will facilitate the use of information which leads to the specific diagnosis and treatment.

"Not only the doctor but also the physical therapist and the social worker should benefit from the more visible information. Utilization Review [committees which determine whether a patient is being hospitalized too long] could proceed more efficiently and rapidly.

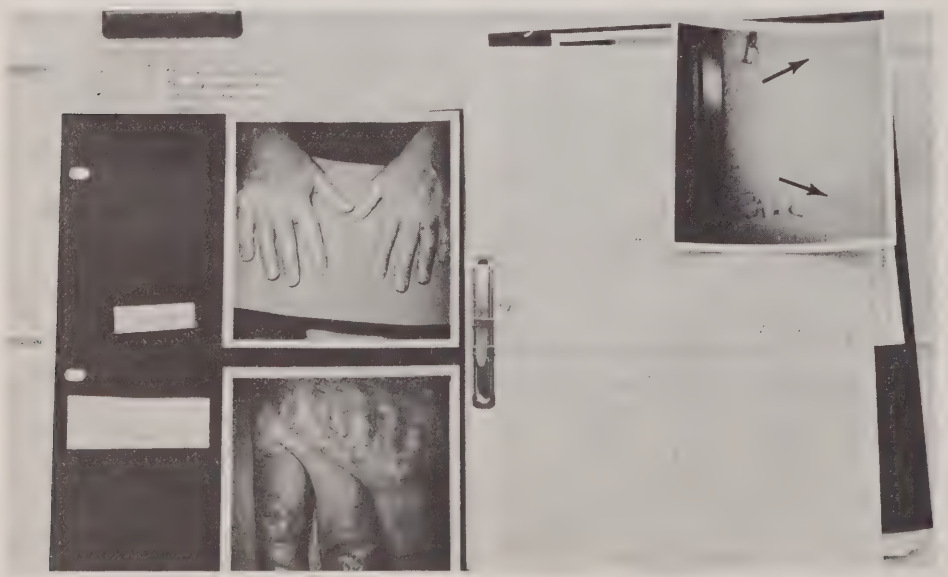
"Insurance companies would get a better understanding of what they're paying for – that the doc did have to put in those 22 facial sutures, that he did have to reduce that compound fracture.

"And the time gained by minimizing the record-keeping demands of medical practice is the equivalent of additional time for new patients."

Dr. Bird and Miss Kerrigan have outlined these views in a grant application. They seek funds for equipment and personnel needed to implement fully the trial program.

"People may throw up their hands in horror," Dr. Bird said. "They may say it costs money to have a picture in the record.

"But if this improves medical care, if it shortens the period of hospitalization, it will end up saving money."



Photographs of patient's hands show psoriasis and one on right, bee stings (note arrows) to which patient is allergic, and resulting rash. Original color pictures clearly depicting these problems form part of experimental patient record.

MGH News

Vol. 31 No. 3 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS March, 1972

Women MDs: "An Extraordinary Accomplishment"

The Lindemann Center: A Family Psychiatrist

A state institution with strong MGH ties is becoming the family psychiatrist for an important segment of Boston.

Completing its first year of patient care, the Erich Lindemann Mental Health Center is reaching out to an increasing number of people. Nearby Beacon Hill and North End residents are particularly mindful of the facilities in Government Center.

In the more distant parts of the area it serves, the center may develop into a second line of defense. Known as the Harbor Area, the facility's function is called the Harbor Mental Health and Mental Retardation Program.

Dr. Gerald L. Klerman, its Superintendent, is striving to mold its role along lines sought by the man after whom the center was named. Dr. Erich Lindemann, Psychiatrist-in-Chief of the MGH from 1954 to 1965, pioneered in community mental-health concepts.

Dr. Klerman, who is also a Psychiatrist at the MGH and Professor of Psychiatry at Harvard Medical School, observed:

"The old idea of the state mental hospital was that of a self-contained society. Like a welfare state it provided all the services for its inpatients: medical care, dental care, and clergy. That only resulted in further isolating the mental patient from the rest of the community.

"We don't attempt to do that, and I don't think we should. The patient should remain imbedded in the normal community life from which he comes. Hospitalization should be as brief as possible just to help the patient get over a crisis. The stay in a hospital is only one phase in an overall treatment program."

This philosophy grows out of Dr. Lindemann's classic work with the people displaced by Boston's early urban renewal venture in the West End. Dr. Lindemann noted the network of human resources within a community: clergymen, courts, lawyers, general practitioners, the school system, and the like.

Twenty years ago psychiatrists taught the teacher and clergyman to recognize mental illness and to refer the potential patients to the psychiatric clinic. The waiting lists grew endless.

"The attempt now is to reverse the tide," Dr. Klerman said. "Besides making these people more effective

(Continued on Page 4)

A skylight at the Lindemann Center

(Medicine is one of the areas in which the indirect influence of the Women's Liberation Movement is being felt. In an effort to learn more about the expanding role of women in medicine, the *News* interviewed physicians of both sexes and studied the literature on this subject. The following article is the result. EDITOR'S NOTE.)

"I see a curious manifestation of human inconsistency in the act of admitting young men to the bedside of Female Patients, while one of their own sex is excluded. It seems a strange perversion of nature and propriety.

"The course of the Medical education of woman has taken root in the common sense of an enlightened Community, and it is destined to grow, all the better perhaps for a little stimulus in the way of opposition."

When Sarah Salisbury wrote this in June of 1858, she was replying to a letter from Mr. T. B. Hall, Secretary of the MGH Board of Trustees, which told her that the Board "deemed any departure from their Rules and Regulations inexpedient."

A graduate of the Female Medical College in Boston, she had applied for the privilege of attending the hospital in November 1857. Whether Miss Salisbury obtained training in any other hospital is not known. However, ten years later, the same Mr. Hall sent a copy of the new resolutions to the Visiting Physicians and Surgeons.

They said: "*First* that . . . the Rules and Regulations for the Hospital may be so interpreted, as to include female, as well as male students. *Second* that

(Continued on Page 2)

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EDITORIAL:

Comes the New Order

The year is 2000, and Harvard Medical School has its third consecutive woman dean. She has called in the Director of Admissions, also a woman, to discuss the incoming freshman class.

Dean Downright – Ms. Moxie, what is the percentage of males in the new class?

Ms. Moxie – Two percent.

Dean Downright – Great Scott, that's less than last year. We promised the Male Liberation Front we'd do better.

Ms. Moxie – I know, but we just can't find suitable candidates. These young men today aren't up to the grind of medical school let alone internship. Their attrition rate is deplorable. Either they weaken physically, or they can't manage the combination of schoolwork and housework. Then if a baby comes along, and there is no day care available . . .

Dean Downright – I know. I know. It is a problem, but there must be some specialty suited to their talents and circumstances – like pediatrics or gynecology.

Ms. Moxie – That's true. Men seem to have a knack for these. But the pace is a bit much when they go into private practice. If they could only get into group practice.

Dean Downright – That day will come. However, right now the women have a stranglehold on group practice. And justifiably so. Women do seem to function better in groups than men. But I do see hope. Men are learning to adapt. And I feel it's our task to bring them along with emphasis on those areas in which they are especially qualified.

Ms. Moxie – Do you think men will ever be able to do complicated surgery?

Dean Downright – Anything is possible. Nonetheless, surgery does take nimble fingers and stamina, rather than brute strength.

Ms. Moxie – What about hospitals? Do you think that a man will ever again rise to head an important department at Massachusetts General Hospital?

Dean Downright – With a little encouragement from enlightened women like ourselves, why not?

Ms. Moxie – What about positions like Dean of the medical school?

Dean Downright – I feel it's our task to bring men along – slowly of course.

Women in Medicine

(Continued from Page 1)

the admission of female students be left to the discretion of the Visiting Physicians and Surgeons, individually. *Third* that female students, whenever admitted, shall be placed in classes separate from male students, and shall attend the clinical practice of the female wards exclusively."

Whether many women students subsequently were admitted to the hospital is not known, but it seems unlikely in the light of a letter, probably dated April 21, 1886, from Dr. R. M. Hodges to Dr. J. Collins Warren which says in part, ". . . I remember, on one occasion, that they [women students or physicians] stood around in the glass room while he [Dr. S. Cabot] did a perineum.

"This was disapproved by his colleagues, and unless I am greatly mistaken, the subject was referred to the Trustees, who sat upon it promptly. . . . At one time the old custom of requiring a ticket from all who entered the Amphitheater was revived for a while, but whether it was to stop undergraduates, homeopaths, or women, I cannot remember, but it was to stop somebody who was objectionable."

The "way of opposition" held steadfast until May 2, 1913, when Willey Denis, a Ph.D. in chemistry, was appointed Assistant Chemist – the first woman staff member. Loretta J. Cummins, MD, was appointed Assistant in Dermatology in 1916.

Two years later Dr. Mary Wright, the first female house officer, began her duties on the Children's Medical Service. Dr. Marian W. Ropes was the first woman resident on the Medical Service (1932) and serves on the Board of Consultation at the MGH today.

There are several unique problems women face, both before they decide to enter medicine, and after they have acquired the MD degree and actively engage in their work.

Comparatively few studies of women in medicine have been published. However, in informal interviews with several female residents, Ph.D.s, and staff at the MGH, their opinions and personal experiences have borne out most of the published studies carried out elsewhere.

The major difference between the United States and other countries in

the question of women in medicine is numbers. Only 7 percent of the medical manpower in America is female; 15 percent in England; 20 percent in the Netherlands; 25 percent in Sweden and India; 30 percent in Germany; and 75 percent in the Soviet Union.

Statistics show, however, that more women are being admitted to medical schools today than 20 years ago. In 1950 (five years after Harvard Medical School – the school with which MGH, as a teaching hospital, is affiliated – decided to admit women) only 5.3 percent of students in all medical schools were females; this year the figure jumped to 13.6 percent.

Last fall 32 women were accepted into Harvard Medical School, nearly one-fifth of the class.

Most women feel their qualifications have to be exceptionally outstanding (as they were in the MGH women) for acceptance into medical school and training programs. One woman was advised against entering for financial reasons although she had already been accepted. She obtained a Ph.D. instead.

Dr. Harold I. Kaplan, Professor of Psychiatry and Director of Psychiatric Training at New York Medical College, recently completed a seven-year study on the effective recruitment and utilization of women in medicine and resistance to them from medical schools. He concluded that "a significant number" were very negative about women entering the field, although there was no overt or official admission policy to refuse them.

All of the women in medicine at the MGH felt that the initial obstacles faced by a female who decides on a demanding career begin before medical school. American society does not generally encourage or support a woman who expresses an interest in medicine.

Dr. Alice D. Chenoweth, in her presidential inaugural speech to the American Medical Women's Association, said:

"The failure of medicine to make greater use of women is apparently a problem with roots in the society as well as in the structure of medicine."

Many of the women at the MGH recalled pressures from others not to attend medical school. However, all of them were strong, self-assured individuals who were certain of their goals. Many of them had parents who were very supportive of their decision: some of the parents were themselves doctors.

Lisa Ridgway, Senior Resident on the Children's Service, and Suzanne Dixon, an Intern, attend to Nicole Stata, a patient in the Pediatric Intensive Care Unit. Nicole's father, Ray Stata, provides a comforting hand.

Nearly all of the women had reached times of minor crisis when they had to reaffirm their professional choices versus a more acceptable life-style in society.

Phoebe Williams, a Ph.D. at Radcliffe Institute, recently published a study of all graduates of Radcliffe who had entered medicine. One of her findings revealed that many of the younger women had undergone crises during medical school in which their images of their own femininity were shaken.

She also found that one of the most decisive factors in a woman's decision to enter the profession was a positive, encouraging adult sometime in her past. One physician at the MGH recalls that a Russian woman doctor influenced her greatly.

Other primary motivating factors were a strong interest in biological sciences, a desire to help people, and a desire to be independent – qualities found in all the women interviewed.

The question of whether female medical graduates will devote enough of their lives to their profession to warrant the time and money invested in their education is often raised by those reluctant to admit more women into medical schools.

Dr. J. Robert Buchanan said in an article in the *Journal of the American Medical Women's Association,* "It is my belief that as long as society is pressing for delivery of more physician services, and as long as the trend continues for direct and indirect governmental support of medical education, there will be every expectation for graduates of medical school to devote a maximum effort to their medical careers. Such a situation does not favor a disproportionate increase in the number of female graduates. . . ."

Statistics show, however, that the figure for women actively engaged in full-time and part-time medical practice, teaching, or research is 91.1 percent. In a survey conducted of Duke University female medical graduates, out of 75 responding, only four were not actively practicing, teaching, or engaged in research. The reasons most often given are inadequate available child care or the pressures of raising a family.

Dr. Leon Eisenberg, Chief of Psychiatry, has said, "If we consider the obstacles that face women in entering medicine, in obtaining training in certain of its specialties, and returning to practice after bearing children, this record should be regarded as an extraordinary accomplishment rather than as any indication of limited potential.

"If we consider how much greater their professional output is likely to be once obstacles to training are removed, day care becomes more widely available for women with children, and problems of reentry into professional life are simplified by the provision of

(Continued on Page 6)

Mental Health Center: A Family Psychiatrist

(Continued from Page 1)

case finders, we want to increase their capacity to be therapeutic and helpful in the schoolroom, in the church, in the court, in the lawyer's office, on the policeman's beat, and in the general practitioner's office.

"Because psychiatry is a very expensive service, we would rather see the psychiatric facility as a backup resource than a place where people always come initially."

The center's outpatient clinic under the leadership of Dr. Gary Jacobson serves almost exclusively the North End, the West End, and Beacon Hill. Outpatient services for other communities cared for by the center would be provided by the MGH-Bunker Hill Health Center in Charlestown, the Chelsea-Revere Clinic for those two communities, and the East Boston-Winthrop Mental Health Center.

Together these communities comprise the Harbor Mental Health and Mental Retardation Area, the Lindemann Center's responsibility with its population base of 180,000. Boston has four other centers, and these five fall among the 39 mental-health and mental-retardation areas formed in Massachusetts.

Lindemann Center seeks to avoid duplicating whatever care is offered two blocks away at the MGH. With emergency aid available at the latter's Acute Psychiatric Service, Lindemann thus can concentrate on other areas.

A Developmental Disabilities program under the leadership of Dr. Steven Reynolds, an MGH-trained pediatrician, is providing services for mentally retarded and disturbed children.

Seven classrooms present educational opportunities, and three are being used by the Boston public schools in a collaborative program for emotionally disturbed children from the Harbor Area.

Youngsters under 7 years of age who are diagnosed as having developmental disabilities are being prepared for the day they can enter special public-school classrooms.

"Their ability to relate to people and objects is often limited," said Mrs. Evelyn McLean, Associate Area Director. "The goal of these classes is to help the children become accustomed to dealing with their peers, to handling toys, and to expanding their physical mobility."

A circular staircase

On the drawing board is a plan for therapeutic classes that would allow adolescents to continue school. An important aim is to provide the youngster with the identity of a student instead of that of a patient.

Looking out from within
(Dark area below contains some of classrooms)

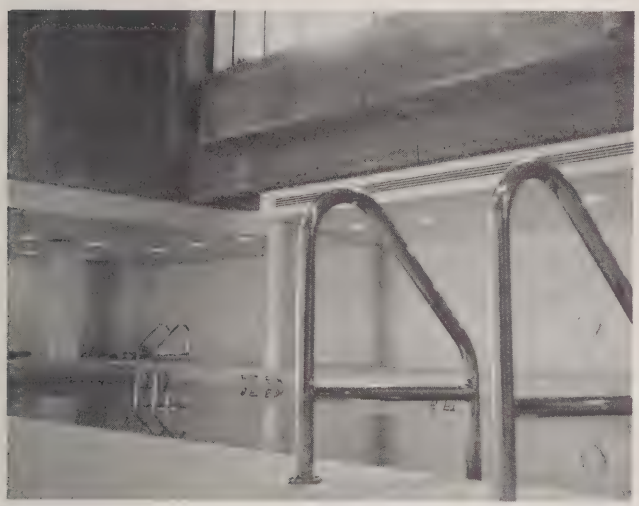
The Lindemann Center also maintains a day program for adult patients. Patients can come in from 9 a.m. to 4 p.m. to get drug treatment, or participate in group meetings, family counseling, rehabilitation, or other services. Yet they continue to live at home.

The advantages are twofold: 1. The patient can avoid any deleterious effects that might come from feeling "institutionalized." 2. Treatment is far less expensive.

"Suppose a young adult in the North End is in some developmental crisis of late adolescence," Dr. Klerman said. "It's far easier for him to be a day patient here rather than go to a state hospital fifteen or twenty miles away."

New drugs have made day care a successful substitute for institutionalization. So has the knowledge that human behavior, in general, and mental illness, in particular, are very responsive to improvements in the social structure of the treating institution.

The chapel



For inpatient and outpatient use

For those patients requiring 24-hour care, the Lindemann Center houses 100 beds. Eventually 75 of these will provide care for adults, and the remainder will be fairly evenly divided between children's services and a special unit for crisis intervention.

A cut in projected state funds, however, has slowed the rate at which the beds are being opened for use. Only about one-fourth of the inpatient facility is in operation. Research is the hardest hit. Although provision exists for a large amount of research space, almost none of it is in use.

The building itself cost $12 million. Designed by Paul Rudolph and by Desmond and Lord, the structure stands out even in Boston's Government Center.

Massive fluted concrete columns abound. Combined with a large overhanging wing, this gives the paradoxic illusion of a building that is at once very modern and very ancient.

Inside, the building employs vast open spaces to lend a feeling of freedom and spaciousness. Circles sweep up staircases and achieve cornerless corners. A series of swirls in the high-ceilinged chapel envelop the devout in an atmosphere of awe.

A white-ceilinged swimming pool and a basketball court will eventually open day and night to serve both inpatients and outpatients.

A Tale of 2 Leaders

The man after whom the Lindemann Center was named is an eminent experimental psychiatrist and psychologist.

During his 30 years at the MGH, Erich Lindemann applied the approaches of the social scientist to psychiatric problems. Boston's Coconut Grove fire of 1942 aroused his interest in changes in the social structure which affect a person's mental health.

In 1948 he pursued this interest when he established the Wellesley Human Relations Service, the first community mental-health center in the country. Preventive psychiatry became the dominant theme.

The relocation of 2,600 families of Boston's West End led to a unique project headed by Dr. Lindemann – a study of the psychological and social stresses of relocation. The wrench of losing the people on whom they had so long depended proved the most important stress.

When the five-year project was completed in 1962, Professor Herbert Gans, a sociologist from the University of Pennsylvania and a member of the Advisory Committee of the West-End Research Project, wrote *The Urban Villagers*. The book came to be thought of as an important blueprint of previously unrecognized human behavior, ties, and needs.

Before coming to the MGH and Harvard, Dr. Lindemann made the very important discovery that sodium amytal is effective on mental functions of the depressed and schizophrenic patient.

The first Superintendent of the Lindemann Center shares a similar background. Working with others, Dr. Gerald Klerman documented the value of compounds like the phenothiazines in restoring normal behavior and adjustment in the acute stages of schizophrenia. For this study the group won, in 1969, the Hofheimer Prize, the highest research award of the American Psychiatry Association.

Like Dr. Lindemann, his studies of the evaluation of social adjustment are among his major accomplishments. Before coming to the MGH and Harvard, he served from 1967 to 1969 as Director of the Connecticut Mental Health Center in New Haven and an Associate Professor of Psychiatry at the Yale University School of Medicine.

Will Mental Health Lead the Way?

If Dr. Gerald Klerman is correct, mental health is providing the model for the delivery of America's general health care of the future.

A Psychiatrist at the MGH and Lindemann Center Superintendent, Dr. Klerman said in an interview:

"The Lindemann Center is a state institution with strong affiliations with the MGH. The center's medical staff holds joint appointments at the two institutions.

"We run a joint program to train residents. Research is done cooperatively. All this, I think, is to the mutual benefit of both parties. So I believe that this arrangement represents an interesting collaborative endeavor between the voluntary and public sectors."

Dr. Klerman credited Dr. John H. Knowles, former General Director, and Dr. Leon Eisenberg, Chief of Psychiatry, both at the MGH, with making the arrangement possible. On the state side, he called attention to the support of Dr. Milton Greenblatt, Commissioner for the Department of Mental Health.

The idea of the Commonwealth's being sliced into 39 pieces for mental health appeals to Dr. Klerman:

"My feeling is that the same will be true ultimately of all our services to people. We will create districts of local community centers – multipurpose centers. Social service, rehabilitation, special-education services will all be together.

"The reason is that we have the paradox that something like five or seven percent of the families in a community make use of maybe seventy percent of public services. There's a tremendous overlap and fragmentation.

"We need to find better ways to coordinate and integrate the services being delivered to the same family. That's an unsolved problem in the organization of human services.

"I think there will be districting of general hospitals and clinics to provide more rational distribution of resources. Then people will know where they should go for their primary care."

A Harbor Mental Health and Mental Retardation Area Board, brought about by statute, is a major innovation in community psychiatry. Headed by Joseph DeLena, this is composed of 21 citizens from the communities comprising the area and serves as the advisory group to the Lindemann Center and to other facilities in the Harbor Area.

"The board," Dr. Klerman said, "represents a vehicle and mechanism through which the communities and consumers participate in indicating their wishes and advising the staff."

Immediate vs. Important

(Continued from Page 8)

problems crying for immediate solutions.

Let's consider this farther – it is my understanding that in the latter part of the 15th century there was deep poverty and even human degradation on the dry and sweeping plains of Aragon and Castile. Yet, Ferdinand and Isabella gave Columbus three ships for the western ocean. The voyage of the Beagle coincided with satanic conditions in English industries, yet, both Darwin and Dickens contributed to our heritage and thereby to human progress.

The immediate must not drive out the important. I hope that this will be recognized for what is intended – not a calloused attempt to minimize the problems of today, but to defend the continuing majestic adventure of scientific endeavor.

Lindemann Center — An exterior view

"Once Into the Field, It's Quite Open"

(Continued from Page 3)

rational job and retraining opportunities, it becomes abundantly clear that womanpower can contribute in a major way to meeting the national shortage of medical care."

Of the MGH women, all but one have been married, and all of those had at least one child; one had five children.

The effort of balancing a demanding career and family responsibilities was often described as "like walking a tightrope."

Many of the problems that result from pregnancy and child rearing are being met slowly and in isolated instances.

The medical student who becomes pregnant or has a child during school years is often expected to carry on as customary. Usually some flexibility in scheduling is offered, but in fear of losing academic credit for a year's work, new mothers take "dangerously inadequate" maternity leave, according to Dr. Kaplan.

Of those women interviewed at the MGH, most acknowledged that "it is extremely difficult to have children and continue to work." None of those interviewed took off more than eight weeks after the birth of a child. One doctor credited her ability to have a large family and continue practice to her "physical stamina and good health."

Finding and paying for adequate child care is nearly insurmountable. One woman said, "I was simply lucky to have a wonderful woman who stayed with me for twenty years."

Another, a Fellow (a title for a form of advanced medical-scientific train-

ing), said that the expenses of adequate child care consumed nearly all her salary. Some felt that the present tax laws which allow a married couple a $600 deduction for one child and $900 for two or more children (if their adjusted gross income does not exceed $6,000) are unfair.

A New York woman, Elizabeth Barrett, is presently challenging that tax law. If she wins her case (the decision will come sometime this spring), it will not mean that working mothers can then claim child-care expenses as a business deduction, unless the Treasury Department itself changes the law. It will, however, establish a legal precedent which may eventually relieve all working mothers of such often crippling bills.

Women in the Duke survey reflect the feelings of their MGH counterparts in that they ask no favors as women. Some say that it was their choice to marry and have children, and they will adjust accordingly.

One was glad her daughters had not chosen medicine for their careers. She said that "if women are determined, they should not be excluded, but they should have a true 'calling' for medicine."

Others acknowledged that in some specialties, training must be intensive and constant, especially in acute medical or surgical care. Part-time residencies are becoming available slowly, and in only a few areas.

One such program, directed by Dr. Kaplan, has extended the traditional three-year residency in psychiatry to four years. Women are free to spend summer vacations with their children. A few women, not at the MGH, have managed to arrange part-time residencies, but thus far this has occurred in isolated cases.

Some of the doctors interviewed think that "women have special and unique contributions to make" in certain specialties such as pediatrics, psychiatry, neurology, and internal medicine.

Female surgeons are few: the MGH Department of Surgery has never accepted a female house officer.

The first woman to perform an operation at the MGH was Dr. Anne Phillips, who in 1950 substituted for a male colleague.

After her marriage to Asa Phillips, Jr., and the birth of her children, she gave up surgery for research on burn injuries, a field in which she is an international authority today.

Joan Kaplan, Ph.D. in biochemistry, at work in her laboratory in the Gray Building

"A woman cannot have two first duties," she said. "If you're a clinical surgeon, your first duty is to your patient, and if you're a mother, your first duty is to your family."

Others agree that surgery is a male-dominated field and will probably remain so. Dr. Howard Ulfelder, Chief of Gynecology, points out that a choice among medical careers by women, just as in the case of men, must take into consideration the physical demands of each specialty activity.

Dr. Eisenberg decries the "great loss of skill to the country" in lack of medical womanpower and feels there are a number of fields such as psychiatry, gynecology, and obstetrics in which women have a "direct intuitive understanding" for the work.

In a survey of female medical-school graduates from 1931 to 1956 who have passed the specialty board requirements, 33.6 percent were in pediatrics, 13.7 percent in psychiatry and neurology, 10 percent in internal medicine, and slightly smaller percentages in other areas.

As changing health-care patterns emerge, women will probably become more active in community-health care, clinics, and group practices, where their hours can be more regular. Often their choice of a specialty reflects their divided responsibility toward career and family.

None of the women interviewed said that they felt any personal prejudice at the MGH because of their sex. "Although pressures from birth to about eighteen are against a girl entering medicine," one woman said, "once into the scientific field, it's quite open." Once into the profession, however, many expressed doubts as to how high a woman could rise.

The Committee on Governance at Harvard Medical School recently passed governance considerations on the status of women. One of the recommendations included in the report was that: "All appointments at all levels within the Harvard Medical School and its hospitals should be made on the basis of professional qualification and should specifically not take into account the race, religion, sex, marital status, or family relationship to other members of the same or different departments of the potential appointee."

Dr. Nathan B. Talbot, Chief of the Children's Service, said, "I think that the mixture of men and women adds a richness to the texture of our thinking which is valuable in pediatrics, and I suspect would be equally valuable in the practice of internal medicine.

"Pressure for opportunities for women per se is not nearly as effective and compelling a means of gaining this type of equality as doing a first-class job whenever given the chance, for when this is the situation, people forget about which sex it is and accept both men and women at their face value."

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The Immediate Versus the Important

(Dr. Lloyd H. Smith, Jr., former Chief of the MGH Endocrine Unit, made an eloquent plea recently for America to keep strong her tradition of basic research. The plea came in a portion of an address last fall in Puerto Rico at the annual meeting of the Markle Scholars, a group of young leaders in academic medicine.

Dr. Smith is now Chief of Medicine at the University of California-San Francisco Medical Center. The excerpt on the need for strong research on fundamental problems rather than practical applications follows. EDITOR'S NOTE.)

The easy fallacy of matching health care against medical research further ignores that health care represents only the delivery of the products of medical research.

The greatest health-care problem in the United States is not the distribution of physicians, of hospitals, or even the astronomical cost of health care, grave as these are. It lies in the continued existence of major diseases about which we can do little.

We face the perils of a halfway technology. For many of our major diseases we can give only minimal comfort, minor alleviation of suffering, but we cannot prevent the disease, cure it, or even materially alter its progress.

Dr. Lloyd H. Smith, Jr.
(From a 1960 photograph)

Certainly it is important for a patient with angina pectoris [a chest pain associated with one type of heart condition] to have a physician who can prescribe nitroglycerin, treat hypertension [high blood pressure] if present, evaluate him for possible coronary artery surgery, and treat him in a well-equipped coronary care unit when his myocardial infarction [heart attack] occurs, as it almost inevitably will.

Still 500,000 to 800,000 Americans will die of myocardial infarction each year, many of them in the prime of life. Which is more important for the American people, to clarify the metabolic derangements which lead to coronary artery atherosclerosis [hardening of the arteries] or to proliferate coronary care units? Heart transplants and even coronary vein grafts are desperate measures of halfway technology.

In my opinion, it would be tragic indeed if the well-meaning push to make them available to all were undertaken at the expense of fundamental studies concerning the pathogenesis [origin and development] of atherosclerosis.

A standard retrospective example may be more compelling. If the drive to set up respirator centers with iron lungs and to propagate Sister Kenny physiotherapy had been at the expense of research on the in vitro [test tube] culture of the polio virus, polio would still be an annual scourge.

One to two percent of all Americans have schizophrenia. It has been estimated that the direct cost of the disease may be approximately four billion dollars per year.

We now spend approximately 20 million dollars a year in research to find the cause of this illness or groups of illnesses, less than 1 percent of its annual cost, perhaps ten dollars per patient. This estimate omits the emotional and psychological cost to the patient and to his family.

There have been many very important advances in the development of psychotherapeutic drugs during the past 15 years which have greatly reduced the number of patients who must remain incarcerated in mental hospitals. This work is important, but it is still halfway technology in our understanding of the pathogenesis of mental illness. There are many other examples which might be cited.

Our message is not to deny that our health-care system is in disarray and disgracefully unfair and unresponsive, particularly to those who need it most. It is inadequate, insensitive, and inequitable and, as such, must be replaced. That is a top national priority agreed to by most of the major segments of our society.

But even if that perfect system were now universally available, rheumatoid arthritis would continue to cripple, cancer and coronary artery heart disease prematurely to kill, schizophrenia to render insane, and drug addiction to destroy. Let me repeat, the product itself is inadequate, even if its distribution were perfect.

It would be shortsighted and foolish, indeed, to mortgage our future chances to conquer major diseases on the fallacy that such work is antithetical to our immediate problems in health care.

Finally, in these comments on the tendency to pit health care against research, in my opinion, we should continue basic biological research even if it were not so immediately relevant to human health. We do this in astronomy, for example, as part of the intellectual adventure and cultural growth of mankind. There will always be real

(Continued on Page 6)

MGH News

Vol. 31 No. 4 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS April, 1972

Frozen Skin Bank Eases Pain and Reduces Bill

Poisoning: Help As Near As Your Telephone

A telephone jangles in a small cubicle in a corner of the MGH Pharmacy. A registered pharmacist answers, "Poison Information Center. May I be of help?"

The frightened voice of a woman replies, "My three-year-old son just drank a half-bottle of furniture polish. What should I do?"

After a quick assurance that the episode is not unusual, the consultant obtains the name and telephone number in case their connection is accidentally severed.

After identifying the ingested product and the amount taken, the consultant checks his files for information on the substance. Good judgment, experience, and sometimes considerable "detective work" are necessary to determine correct information from a distraught parent. The consultant then gives instructions on the proper emergency treatment and advises that the child be taken immediately to a hospital for a medical checkup and follow-up treatment.

For acute cases such as this, the Boston Poison Information Center is staffed 24 hours a day, 7 days a week. Four hospitals participate in the program to make full-time coverage possible: the MGH, Children's Hospital Medical Center, New England Medical Center, and Boston City Hospital.

One main telephone number (232-2120) links all four to a central switchboard at Children's Hospital. Each institution receives incoming calls during certain hours.

The MGH Poison Information Center, the only one of the four staffed by registered pharmacists, receives calls Monday through Friday, from noon until 5 p.m. On weekends and holidays calls are automatically shifted to the Children's Service in the Burnham Building, where pediatric resident physicians handle inquiries.

The Boston Poison Information Center has been in operation since 1954 and is one of more than 600 such facilities in the country. At the MGH, registered pharmacists, under the direct supervision of Vincent A. Cervizzi, Sr., assumed the responsibility for handling calls in November 1966.

Kenneth M. Rosenthal, Supervisor of the Inpatient Pharmacy, acts with Mr. Cervizzi as coordinator. John W. Webb, Director of Pharmacy and Supplies, wrote the guidelines for answer-

(Continued on Page 7)

Looking down at storage tank containing 32 individual packages of skin frozen at —256° F.

A joint MGH-Shriners Burns Institute skin bank is helping to ease the pain and reduce the hospitalization and expenses of burn patients.

Persons needing skin grafts for other procedures at the MGH are also benefiting.

What makes the bank possible is a process of freezing and thawing skin. Devised by MGH scientists working in laboratories at the adjacent Burns Institute, the new method permits the storage of skin for at least six months instead of the usual two weeks.

"Keeping skin refrigerated for two weeks really doesn't help significantly," said Dr. John F. Burke, an MGH surgeon who is Chief of Staff at the Burns Institute. "You may get a lot of donated cadaver skin in a period of three or four days when you don't need much. Three weeks later you may develop a great need and find the conventionally stored material outdated and no donor in sight.

"This intermittent availability of donors and need for skin made it very clear we had to have some means of stockpiling it for use at a time no donor is available."

Dr. Conrado C. Bondoc, of the Department of Surgery at the MGH and of Shriners Burns Institute, began searching for a way to preserve skin by freezing it. Groups in England and Pennsylvania had reported some results. Their complex methods, however, were not too practical for freezing and thawing large amounts of tissue.

Dr. Bondoc consulted Dr. Charles E. Huggins, Associate Director of the MGH Blood Bank. Dr. Huggins' tech-

(Continued on Page 4)

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EDITORIAL:

A Donation That Has Been Overlooked

Nobody likes to think about dying. For that reason many adults never even get around to making out their wills. It is no wonder that few of us ever donate our bodies for transplantation procedures. At some level we feel there is something sacrosanct about our bodies – even in death. This is so despite the fact that religions generally agree the physical body serves no function after life. Indeed many people professing no religious belief whatsoever still feel somewhat uneasy about the matter.

In recent years, however, science and logic are making inroads on superstition. People are increasingly donating their organs through formal wills. The Massachusetts Kidney Foundation at 137 Newbury St., Boston 02116, coordinates donations of all organs. In the first nine weeks of its existence, it has registered 12,000 donors.

This issue of the *MGH News* describes a portion of the anatomy not yet successfully transplanted. The skin, nevertheless, serves a valuable function at hospitals like the MGH which use it as a temporary covering for wounds such as burns. It can be life- and limb-saving. It can help reduce the patient's hospitalization and hence his costs. It can eliminate areas of excruciating pain. All this can be accomplished by skimming off the top 1/100 of an inch of the donor's skin. The thought of losing such an imperceptible amount after death seemingly should not cause much apprehension for even the most squeamish potential donor. Especially so, when he has the added knowledge that the new frozen skin bank assures any potential donor that none of the skin will be wasted.

The fact is, nonetheless, that the demand for donor skin still outstrips the supply. Undoubtedly a major part of the lack of public response results from the dearth of publicity. As one surgeon said, "If people knew how useful this is to those who are alive . . . , there would be many, many more individuals who would give permission for the use of their skin." This can be achieved in two general ways. Persons wishing to donate their skin after death can register with the Massachusetts Kidney Foundation either to offer any organs or parts, or to specify skin only. In the long run, this will prove very beneficial. For today's more pressing needs, the second method involves the immediate family of someone who has just died. By approving either an unrestricted autopsy or one restricted to the use of skin, untold suffering can be prevented and lives saved.

Because the need exists for all types of organs and parts, the *News* urges general donations and unrestricted autopsies. But the postmortem loss of only a partial thickness of skin may prove the answer for those unable to bring themselves to donate an entire organ.

A Common Arthritis Baffling to Scientists: Search for Answers

Osteoarthritis – a painful disease which afflicts millions of middle-aged and older Americans. Cause? Unknown. Cure? Nonexistent.

Dr. Henry J. Mankin, new MGH Orthopedist in Chief, is in the forefront of scientists seeking the answers. His work has already led him to a hypothesis, a scientific guess based on experimental evidence.

The roots of this work grew in research he has conducted for more than a decade, most recently at the Hospital for Joint Diseases in New York City, where he was Director of Orthopedics. He was also Professor and Cochairman of the Department of Orthopedics at Mt. Sinai School of Medicine.

In New York, Dr. Mankin focused his research attention on articular cartilage. A highly specialized form of connective tissue, articular cartilage is the smooth, white material which covers the ends of bones that form a joint.

Normal movements of a joint are heavily dependent on this highly resilient tissue which helps absorb the shock of weight bearing and lubricate the joint.

(Continued on Page 3)

Letter to the Editor

Dear Editor:

The statement on page 7 of the *MGH News* of March 1972 that "the MGH Department of Surgery has never accepted a female house officer" is incorrect. Dr. Anne Brace was a surgical intern and subsequently a surgical assistant resident on the surgical services at the MGH prior to her transfer to the BLI-Three Hospital OBGYN residency program. She is now a member of our staff, Dr. Anne Brace Barnes.

I do not wish to deny that many male surgeons do have prejudices against females in the field. There also have been strong cultural influences at work but an additional matter of factual record is that there have been few female applicants for the surgical program over a good many years. I do not know if this has increased over the last few years to any significant number.

HERMES C. GRILLO, MD
Visiting Surgeon – MGH

Initially Dr. Mankin and his colleagues studied the material's biochemical composition, especially the content of protein and specialized sugars.

They also studied the metabolism and established how the cells of cartilage manufacture the all-important matrix (substance between the cells) which provides the tissue with its physical properties. For both animals and humans, they determined the turnover rate for the matrix, the speed at which it is formed, and at which it is destroyed.

About five years ago, when the basic studies established a pattern, Dr. Mankin and his group turned to specific diseases and especially osteoarthritis.

Unlike some forms of arthritis, osteoarthritis usually is not associated with inflammation. It occurs in people beyond 45 and appears to be a slow "wear and tear" change, principally affecting the joints which take the brunt of a person's weight: the knees and hips. Less commonly the disease may affect other joints as well.

"Although it is rarely a cause of either death or very severe crippling," Dr. Mankin said, "it certainly causes enormous problems in the normal conduct of one's affairs."

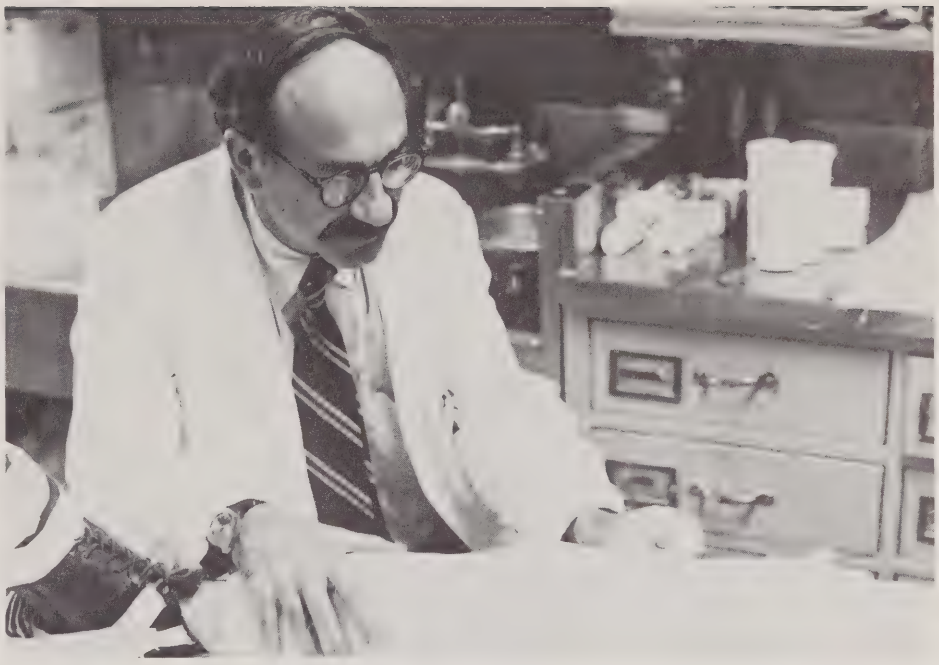
Dr. Mankin's group compared the changes in structure, biochemistry, and rate of formation and destruction of the cartilage in the diseased joints with those of the normal ones.

As a result of these studies, they have worked out the following hypothesis: Some unknown insult triggers a self-destructive process. This process is mediated and governed by the release of a series of enzymes, substances which bring about a biochemical reaction. Produced by the cell, these enzymes destroy at least a portion of the critical matrix between the cells of the articular cartilage. The highly complex sugars are particularly vulnerable.

The investigators believe, however, that the process is not purely destructive. The cartilage responds to this insult by an active attempt at repair.

The repair process is a unique one for connective tissue or for most tissues. It is dependent on the ability of the cartilage cell to revert to a young-cell type. Thus, it is once again able to make new cells and large quantities of an immature form of the substance between the cells.

"Our hope and approach to this problem," Dr. Mankin said, "would be to diminish or stop the self-destructive process by interference with the enzyme systems. Secondly, we would like to enhance the repair process by the administration of suitable chemical agents."



Dr. Henry J. Mankin

The group is currently trying to improve the repair process in animal studies with a material called uridine diphosphate (a nucleic acid intermediary). At the MGH, Dr. Mankin is continuing these animal investigations. He has also recently become intrigued with the possibility that growth hormone might have a similar effect on the repair potential of articular cartilage.

In patient care, his expertise and interest lie in a variety of forms of arthritis and metabolic bone diseases. The latter group of disorders results from abnormalities in the way the body handles the building up or tearing down of constituent substances of bone and connective tissues.

Dr. Mankin comes from New York with a six-year apprenticeship of delivering orthopedic care to 100,000 disadvantaged individuals in East Harlem. He hopes to be able to continue this interest in MGH community programs.

A word that returns repeatedly to his conversation is *interdisciplinary:*

"Medicine has become more complex, and the specialties have tended to become more isolated from one another by virtue of the amount of information required in their individual spheres of interest. It is only by communication that the specialties can derive benefit from the information available from one another.

"I'm a very strong believer in active interdisciplinary approaches, multifaceted involvement in patient care, research, and education. I think everyone benefits, especially the patients."

The new Edith M. Ashley Professor of Orthopedic Surgery at Harvard Medical School, effective July 1, Dr. Mankin is a dedicated educator. For the past three years he has served as Chairman of the Committee on Examination and Evaluations of the American Academy of Orthopedic Surgeons which annually administers the Orthopedic Intraining Examination to the 2,000 or so residents in the United States and Canada.

"What was initially a fun thing writing a few questions," he said, "has become an area of increasing interest and great concern to me. I want very much now to understand examination techniques and processes of evaluation in education."

Among his other pursuits Dr. Mankin serves as Associate Editor of *Arthritis and Rheumatism,* the *Journal of Bone and Joint Surgery,* and the *American Digest of Foreign Orthopedic Literature.*

In what spare moments he manages, he relaxes at his easel, doing watercolors. He retreats from science by concentrating on impressionistic city scenes, replacing the clear magnified image of the microscope with his fuzzy, stylized interpretation of the urban environment.

Saving a Catastrophic Amount of Psychic Injury

(Continued from Page 1)

nique had made practical the freezing and thawing of blood.

With the resulting suggestions as a starting point, Dr. Bondoc worked out a practical and inexpensive system. He froze skin in a plastic (polyethylene) envelope which resists a wide range of extreme temperatures and at the same time seals itself off from outside gases and liquids.

The freezing in general follows a technique devised in England by Sir Peter Medawar: The skin is frozen slowly at 1 degree centigrade per minute until reaching –70 degrees centigrade (–94 degrees Fahrenheit). At that point the freezing can be speeded up until reaching the ultimate goal of –160 degrees centigrade (–256 degrees Fahrenheit), the temperature of the liquid nitrogen used for the freezing.

As with the water in a blood cell, the water in a skin cell must be replaced beforehand with glycerol, a substance that does not freeze. Dr. Bondoc found that a 15 percent solution worked well. And storage tanks filled with liquid nitrogen preserve the skin until needed.

The most significant contribution of the new method is the thawing process.

"The rate of thawing is more critical," Dr. Bondoc said, "than the rate of freezing. You can get away with fast freezing, but you can't get away with slow thawing. The skin must be thawed in less than one minute."

Dr. Bondoc's method of freezing and packaging permits that all-important quick thaw. The technician simply tosses the –160 degree centigrade envelope into a bath of 37 degree (98.6 degrees Fahrenheit) water. In seconds the skin reaches that body temperature, making it ready for use.

Once the technique became practical, Dr. Bondoc tested the frozen skin on guinea pigs. Long experimentation proved the method keeps the tissue healthy for at least six months.

Inexpensive and simple, the method seemed ideally suited to human grafts. With the animal tests demonstrating the safety and potential benefit, human use began cautiously in 1970. Surgeons found that skin stored for six months produced as good a graft as that stored with traditional methods for two weeks. Clearly the technique was successful.

Over the next year surgeons grafted onto 193 patients over 500 square feet of frozen human skin. Several hundred individuals have by now been treated this way at the MGH and Shriners Burns Institute. The vast majority suffered from second- and third-degree burns.

"A burn is the most serious injury that human beings can survive," Dr. Burke said. "If one breaks a few bones in a car accident, the patient usually is at risk for about one week. But even a medium-sized burn like 30 percent puts the patient at risk for about one month. In addition the pain with a serious burn is excruciating."

Closing the burn with a skin graft stops the pain caused by the open wound. It also reduces the hazard of bacterial infection and restores the barrier which prevents escape through the surface of the wound – of water, protein, and another important type of substance called electrolytes.

A patient with extensive second-degree burns lacks enough healthy skin to transfer to all the burned areas. Skin donated from cadavers is taken from the freezer and grafted onto the wound. As foreign tissue, it is eventually lost, but the temporary protective cover allows the second-degree burned skin to regenerate itself rapidly, free from infection.

In the case of third-degree burns, the frozen skin also provides a temporary cover for open wounds not ready for grafting with the patient's own skin.

Harry ———, for example, entered the MGH with severe burns charring 65 percent of his body. Most of them were third-degree burns.

The 38-year-old man would have been hospitalized at least three months if it were not for the skin bank.

Banked cadaver skin only 1/100 of an inch thick provided a pain-stopping covering that helped prevent externally caused infection.

Until Harry's defense mechanism rejected the foreign tissue, the donated skin also took part in the healing process.

To keep the burns covered after rejection, surgeons grafted on donor skin on four occasions. Twice, as various wounds became ready for permanent closing, the doctors grafted his own skin on.

Instead of the expected three months, he left the hospital in 69 days.

At the Shriners Burns Institute where hospitalization for burns on 25 to 40 percent of the body's surface had in the past required an average stay of 71 days, a combination of infection-control measures including the use of frozen skin has reduced the stay for

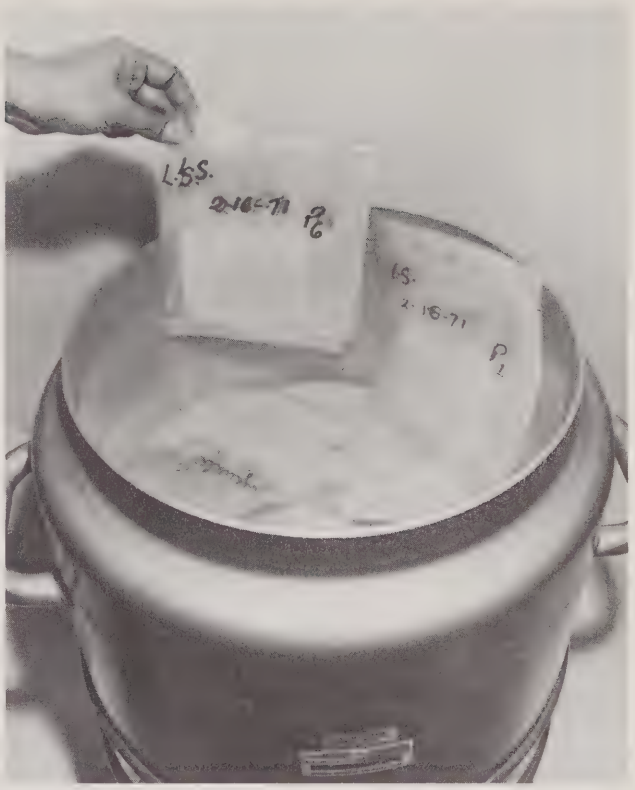
Three petri dishes contain skin soaked in 15 percent glycerol to protect it from a freezing injury. Miss Gabriele Pollinger, Research Technician at the Shriners Burns Institute, lays skin on an adaptic gauze before packaging in a plastic bag.

Another Step in Treating Burns

The practical method for freezing and thawing skin announced here marks the latest in a series of advances by the MGH in the treatment of burns.

Around the time of the Coconut Grove holocaust, the hospital pioneered a fluid therapy. Considered a major step, this treatment, with improvements, is still used the world over.

The MGH was one of the first hospitals to use cadaver skin to provide a temporary cover for burns. By itself, however, this is considered only a partial step, one to be completed only with the ability to perform a true transplant which would be permanent.



Packaged and frozen, the skin is protected for at least six months. Here a package about to be used is lifted from the storage tank at the less frigid edge of the plastic.

these medium-sized burns to 36 days.

"A catastrophic amount of pain and psychic injury is saved," Dr. Burke said. "There is also a huge dollar difference between 40 and 71 days."

One of the biggest problems is the patient whose severe burns become ready in stages for grafting with his own skin. Before the use of freezing, he needed frequent operations under anesthesia to remove healthy skin for those burned areas ready for a permanent replacement.

Now the surgeon can remove at one operation all the skin that will eventually be required and freeze it. As each third-degree burn area reaches the clean state in which a permanent graft becomes acceptable, the surgeon implants some of the stored skin in a simple anesthesialess procedure at the patient's bedside.

The MGH and Shriners Burns Institute also commonly use frozen skin from cadavers as a temporary measure to close problem areas such as skin ulcers, tearing type wounds, and leg fractures in which skin closure following open reduction proves difficult.

With frozen skin readily available, the surgeon can quickly obtain the necessary supply without the need for taking the patient's own skin.

The importance of long-term storage will expand as man learns to successfully transplant skin from one human to another.

"It is in burns that the ability to transplant would be most helpful," Dr. Burke said. "When a patient loses 70 or 80 percent of his skin, the problem of making the remaining 20 or 30 percent stretch to cover the loss is a very difficult task. It would be much more satisfactory to borrow skin from somebody else and put it on the patient."

The difficulty parallels that of other organ transplantations – rejection of foreign tissue. In fact, transplanted skin may provoke a greater response than a transplanted kidney or liver.

At the MGH and other institutions scientists are still struggling for practical ways to knock out this rejection response to transplanted skin. For the time being, though, their inability is the reason why they are using cadaver skin to close wounds temporarily until the patient's own skin can form a permanent replacement for an area ravaged by third-degree burns.

More than just a dressing, the temporary skin actually takes part in the wound's healing process for a week or two which is approximately when rejection occurs. The immediate goal is to extend the one- or two-week period to several months. Ultimately nothing short of a permanent "take" is desired.

When that possibility becomes reality, freezing skin will develop into an international practice. Banking skin will provide a ready access to the type immunologically closest to a particular recipient and therefore most likely to avoid rejection. Having the bank available will also provide the greater supply of skin needed to meet the increased demand that transplanting will cause.

Hospitals as far away as Germany are already looking into the MGH-Shriners skin bank with a view to starting their own. By next year several such banks are expected to be operating around the world.

Caution in Choosing Donor Skin

Even with a storage bank, the MGH and Shriners Burns Institute still face periodic shortages of skin for grafting.

Part of the problem is the need for selectivity among donated cadavers. To avoid the possibility of transferring infectious disease to the patient, the surgeons reject donors who die of infectious disease.

Similarly the doctors shun tissue from those who die of cancer. Even though an individual may die of some other cause than hepatitis (liver inflammation), a history of that disease is enough to result in a turndown.

The large amounts needed for adult burn patients at the MGH add to the drain. So do the other types of ailments for which frozen skin proves helpful.

A family scene from a typical rural area

Household visit to complete questionnaire on family planning

A teaching seminar following house-to-house interviews

THAILAND

(Continued from Page 8)

obtained a grant from the World Assembly of Youth and conducted a two-week project in eight villages of rural northeast Thailand. Their objectives were to obtain detailed information on fertility and on family-planning knowledge, attitudes, and practice among the villagers.

They also held educational sessions (like the one described above) to explain family planning and contraception to these rural people, all of whom had less than four years of schooling.

On a typical day, the students entered a village in the morning and met with the village leaders. Interviews were conducted in every household, and then a large village meeting was organized, followed by small group seminars.

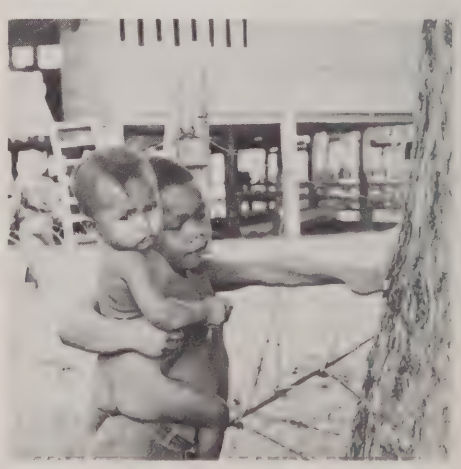
Plans are being developed for a follow-up survey of family-planning practices, to judge the impact of the Ecology Action Group's educational efforts.

This kind of voluntary field work, carried on by students who have almost all been raised and educated in modern Bangkok, is a valuable learning experience. And for the teachers, too.

I remember meeting an elderly man who, in his 63 years in the village, had seen only one other white *farang* (foreigner). He had never been more than 25 miles from his village despite the fact that the main north-south road and railway were little more than a mile away. He asked how long it took to get to America.

I asked, "By what means of transportation?"

"By train or bus – either one," he answered.



Children from a village in northeast Thailand

Computer Promises Help in Poison Cases

(Continued from Page 1)

ing the poison-control telephones in the Pharmacy and handles the overall administration.

The Center, sponsored by the Massachusetts Department of Public Health, Division of Maternal and Child Health, provides poison information for the entire New England area as well as Metropolitan Boston. Dr. Nathan Talbot, Chief of the MGH Children's Service, is Chairman of both the Advisory Committee and the Executive Committee of the Center.

"Although children are the most frequent victims of accidental poisoning," Dr. Talbot said, "we don't overlook the need for immediate information to people of all ages. These four participating hospitals are providing a valuable needed public service."

Dr. Frederick H. Lovejoy, Jr., Executive Secretary of the Boston Poison Information Center, estimates that more than 500 healthy children die as a result of poisoning each year in the U.S. The most commonly ingested poison is children's aspirin. The above figure, however, represents only a small fraction of the three million people who ingest poison but are successfully treated.

At the MGH, between 10 and 25 calls are received during an afternoon. The two telephones for incoming calls are manned by two pharmacists on hourly shifts.

A poisoning report card is filled out for every call, providing space for information on the product, ingredients, amount taken, time since ingestion, symptoms, age, etc. A copy of the form is sent to the Food and Drug Administration's Poison Control Clearing House in Washington.

Surrounding a small built-in desk where the telephones are answered are shelves containing reference books and up-to-date literature. Supportive information supplied by the Poison Control Clearing House on over 20,000 different products is filed on index cards and updated monthly.

In addition, experts on poisonous spiders, fish, plants, drugs of abuse, lead and industrial poisoning, and consumer products are available as consultants. When information on a commercial product is not contained in the files, the company will be called to obtain necessary data.

Jane Iorio, Registered Pharmacist, and Sarah Ross, Pharmacist, receive a call on one of the MGH Poison Center telephones. Books, files, and computer provide backup data for poison evaluation.

Resident physicians in the Children's Medical Clinic are available via a "hot line" to the Pharmacy Poison Center to provide consultation. If necessary, the physician can be linked to the outside caller to offer his immediate advice.

Any incoming calls from other physicians or emergency rooms are directed through the "hot line" to the consulting MGH physician.

Last fall the MGH, in conjunction with the Food and Drug Administration, installed a cathode ray tube terminal in a computer pilot study.

The MGH computer, one of only six in the country (others are located in New Orleans; Kansas City, Missouri; Seattle; Washington, D.C.; and Detroit), is linked to a central computer data bank at Bethesda, Maryland.

Within moments of receiving a call, the computer can relay a product's ingredients, manufacturer's name and address, toxicity level, symptoms, and emergency treatment.

When the data bank contains a full listing of potentially poisonous substances, its effectiveness will be a tremendously efficient help in supplying Poison Information Centers throughout the country with lifesaving facts.

It will also provide a useful log of statistical information on incidences of poisoning and fatalities, as well as a source for industry to gain data which will enable it to provide better, safer products and packaging.

Even when the project has been in operation for a longer time and has been sufficiently evaluated, the consultant will retain his critical role.

"A well-rounded consultant," said Mr. Cervizzi, "besides being knowledgeable in this area, must also exert a good measure of common sense. Whether a true emergency exists or not, each caller is in acute distress, and our job is to provide him with calm, fast information during a crisis."

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"Since It Is So Simple...Do It Right Now"

(The following article was written for the MGH News *by Dr. Michael Stewart, an intern and resident at the MGH from 1965 to 1969. He is now Assistant Professor of Medicine and Community Health at Ramathibodi Hospital in Bangkok, Thailand, in Southeast Asia as a field staff member of the Rockefeller Foundation.*
– EDITOR'S NOTE.)

Northeastern Thailand is a remote area largely removed from the bustle and technology of the 20th century.

There I recently visited a group of some 40 Thai medical and science students who were conducting seminars on family planning. These seminars were for village youth, but older people also gathered around to demand teaching seminars.

Three men in their 40s and 50s stepped out of the crowd to volunteer for a vasectomy (a procedure to make them sterile).

"Since it is so simple and effective," one of them said, "do it right now."

Their faces fell with disappointment when told they would have to go to the health center, some 10 miles away.

This incident illustrates one of the frustrations of teaching community health in Thailand: knowing what needs to be done, and then getting it done, are two different matters. Still, working in the broad field of community health is a very rewarding experience.

A population explosion, widespread malnutrition, tuberculosis, numerous diseases caused by parasites, childhood pneumonia and diarrhea, venereal diseases – these are some of the health problems that grip Thailand.

Yet public health has traditionally lacked the glamour for Thai medical students that attracts them to patient-care specialties. Given other options, few graduates presently choose careers in public health or preventive medicine.

At Ramathibodi Medical School, some new approaches to teaching community health are being made. The undergraduate medical curriculum is specifically designed to give students the problem-solving tools needed for understanding the nature and extent of their nation's health problems, and for designing solutions to these problems for defined population units. Eighty-five percent of the population lives in rural areas, and the curriculum explicitly seeks to prepare students for rural work during their two-year period of required government service after internship.

Symbolic of changing student attitudes, the Ecology Action Group, a student-organized and student-operated association, was formed to combat traditional public apathy to ecological problems. The group focuses largely on population growth and environmental pollution.

These students come from several classes in the medical school and from other scientific facilities in Mahidol University. They seem to reflect the same spirit of activism and social concern that has infected students in the United States.

Stimulated by Ramathibodi's undergraduate courses in community health, they began asking themselves:

"What can we, as future health professionals, contribute now to solving the important problems of population and pollution?"

They decided to focus public attention through displays and exhibits by distributing information and by operating teaching programs.

During a recent vacation 42 students of the Ecology Action Group

(Continued on Page 6)

The author, Dr. Michael Stewart, meets with the village leaders to discuss family planning and contraception.

MGH News

Vol. 31 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS May, 1972

Could a Resident Surgeon Lead Historic Replant?

Achieving Good Health for the Very Young

Gerard Serou is already looking forward to school next fall in Marseilles, France. For two years, illness has kept the 10-year-old from classes.

Last February he underwent an operation at the MGH. One month after the surgery, which was largely developed at this hospital, he was back in France frolicking with his dog, Sweetie.

"Gerard ought to do fine," said his surgeon, Dr. W. Hardy Hendren, III, who is Director of the Division of Pediatric Surgery at the MGH. "He can return to school and should be able to participate in sports if he wishes."

What Gerard suffered from is a condition with which he was born called megaureter. In this, one or both of the ureters – tubes which carry urine from each kidney to the bladder – are much too large and in many patients are badly twisted.

In some the lower end of the ureter is too small and blocks the flow of urine from the kidneys to the bladder. In others the lower end is too big and allows urine to backwash from the bladder to the kidneys.

The resulting complications can eventually prove fatal unless the condition can be corrected.

In Gerard's instance both his ureters were affected. Five operations in France had failed to help. Without a successful corrective procedure physicians predicted his life would be very short.

Ten years ago most of the children with megaureter ended up with a permanent bag outside the abdomen to receive their urine in hope of preventing further kidney damage and, eventually, kidney failure.

At about that time Dr. Hendren began work at the MGH to devise techniques to correct this condition reliably and safely. As with most new operations, this one involved using some previously proved concepts and adding other new approaches. The result was today's procedure which has worked well in most of the 75 children for whom it was performed at the MGH.

It involves first removing the lower end of the ureter from the bladder. Kinks are straightened.

The size of the ureter is often very great. It is trimmed down to about lead-pencil diameter.

(Continued on Page 7)

It was 10 years ago this month that the right arm of Little League Pitcher Everett Knowles was rejoined in an historic operation. The 12-year-old lost the limb near shoulder level.

Ten years ago this month a freckled-faced redhead was wheeled into the Emergency Ward – and medical history. Beside him on the stretcher, partly hidden in his blood-drenched sleeve, lay his amputated right arm.

In the outburst of articles since, one theme recurs: MGH surgeons had been planning for years to replant a severed arm. All they lacked was a suitable patient.

Not so, according to Dr. Ronald A. Malt, the surgeon who coordinated the operative team. The thought had never occurred to him.

Lost in the torrent of magazine and newspaper words which followed the successful operation was the fact also that Dr. Malt was a resident, albeit the Chief Surgical Resident. How could a surgeon who was still a resident coordinate a team with diverse specialties in a highly complex procedure?

"This was strictly a product of the training system here, which is based on the principle that within limits every general surgeon should be well trained in the surgical specialties," one physician observed.

Dr. Malt and the other residents had served under Dr. Edward D. Churchill, who was then Chief of Surgery. As he evaluated the situation on May 23, 1962, Dr. Churchill's philosophy echoed through Dr. Malt's mind:

"The way to handle something that you never met before is to *reduce it to its simplest terms* and take everything in steps. Conquer each step individually."

The team analyzed the problem into its component parts. The young man

(Continued on Page 2)

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EDITORIAL:

The Red Chinese Make a Claim

One year ago the Red Chinese announced they had successfully replanted a number of amputated arms. What's more, in 1963 they performed what they claimed was the world's first successful procedure. That announcement amused those who have seen Everett Knowles repair cars or speed along automobile race tracks. Very much in evidence turning screwdrivers and lifting heavy objects is the right hand and arm that MGH surgeons replanted on May 23, 1962.

Perhaps the Chinese were unaware of this history-making operation. At any rate their unfortunate claim to priority tends to obscure their real achievement of restoring the arms of so many amputees. This ability certainly demonstrates that the Chinese surgeons involved possess an unusual degree of skill and of knowledge in the area of vascular surgery. For their success they deserve the highest praise.

Just as an erroneous claim might have diminished the Chinese achievement, so the original drama of the Everett Knowles replant eclipsed the significant story behind the MGH replant: the fact that a resident surgeon could lead a team hastily gathered for a highly complex, unplanned procedure for which there was no successful precedent. What made this possible is the rigorous, versatile training program which the best teaching hospitals offer. MGH interns and residents watch some of the world's finest surgeons perform the specialized operations for which they are so well known. A general surgeon trains under specialists in many fields. By the time he has rotated through several surgical specialties, the resident has gained an overview that lets him appreciate how the various procedures interrelate. It was this type of perspective that allowed a resident to direct the Knowles replantation team.

And thus, it is this same training that makes a resident so valuable in an emergency. It may be a case in the Emergency Ward itself. Or it may be an emergency that develops during the night when the patient's own surgeon is at home. Within a few minutes a resident can be performing lifesaving surgery. Well-trained medical and surgical interns and residents form a key part of the large team that makes a great teaching hospital great.

Tenth Anniversary Of Historic Surgery

(Continued from Page 1)

lying on the stretcher was a 12-year-old Somerville Little League pitcher named Everett Knowles, who pleaded with the doctors to save his pitching arm.

It would have been so easy to treat him for shock, close the wound, and recommend that he be fitted with an artificial arm. Since no completely severed limb had ever been successfully rejoined, there was no guarantee it was possible.

Reduce it to its simplest terms.

Reduced to basic elements, replanting a severed arm means joining bones, joining blood vessels, joining skin, joining muscles, and joining nerves. All these problems had been conquered before in humans. Why couldn't they be combined?

Within minutes of Everett's arrival, the hospital's blood bank had begun to transfuse three pints of blood into a vein to bring him out of shock. (The blood loss was routine. That very day the hospital was treating two other patients, one of whom required 90 pints,

Letter to the Editor

Dear Sir:

After reading your editorial on page 2 of the *MGH News* (April), I think I should register with some organization. . . . Your editorial suggested registering with the Kidney Foundation of Massachusetts. How could I go about this? . . . How about publishing a form in your *MGH News* which would give more people the idea and convenience in registering.

D.A.B.
Swampscott, Mass.

(The above is typical of letters and telephone calls to the *MGH News* from people wishing to donate their bodies, or a particular organ or part, after death. However, the Kidney Foundation has requested that prospective donors use uniform donor cards of standard thickness rather than ones printed on paper. The cards can be obtained by writing the Kidney Foundation of Mass., Inc., 137 Newbury St., Boston, Mass. 02116, or telephoning (617) 261-1943. Editor's Note.)

the other, 60, in the course of their treatment.)

Meanwhile residents had wrapped the severed arm in sterile towels and packed it in ice. This cooling process markedly slowed deterioration and consequently provided more time for evaluation.

The first consideration was the boy's survival. If the rejoined arm became gangrenous, Everett could die.

Were the arteries and veins of the amputated arm open and uninjured? The residents alerted the operating room to prepare for an unusual procedure.

In the operating room an assistant resident ran a solution through the blood vessels of the arm. Among other things the solution contained a radiopaque substance which under X rays would outline the arteries.

At the same time anesthetists in another room were preparing Everett for possible anesthesia. He proved a suitable candidate for anesthesia. A physical examination revealed that aside from his left hand and right arm he had not only escaped injury but also was otherwise healthy.

X rays showed the blood vessels of the arm were open all the way to the fingertips. With the father's consent the decision was made: Operate! Roughly an hour and a half had elapsed since Everett had hopped a freight train and slammed into a stone abutment.

To assist him and the other residents, Dr. Malt quickly assembled Dr. Robert Shaw, Dr. Bradford Cannon, and Dr. David Mitchell.

There was much to be done, but no blueprint to describe how.

Reduce it to its simplest terms.

The first major step chosen was to join the two main (brachial) veins serving the arm. Next the surgeons sutured the main (brachial) artery leading down into the arm.

One of the group removed the clamps which had controlled bleeding until then. Blood surged into the rejoined vessels, turning the white, cold arm pink.

Encouraging – but much more work remained. For one thing, the bone had to be joined.

The conventional methods of fixing it in place failed, and Dr. Malt improvised a way of jamming the amputated part back. The improvisation worked. To achieve a stable union, the surgeons inserted a stainless steel rod into both parts of the separated bone.

The next problem was the three main nerves leading down the arm. Should they be joined now or at a later date?

Reduce it to its simplest terms.

Another thought flashed into Dr. Malt's mind. From extensive experience in war injuries, Dr. James C. White, formerly Chief of Neurosurgery, had taught residents that nerve repair should be delayed.

At the time of an accident, it is impossible to tell how much damage results to a nerve. If damaged nerve ends are rejoined, it takes many months or longer to determine the need for a new operation, and by then even the healthy segments may lose their ability to function.

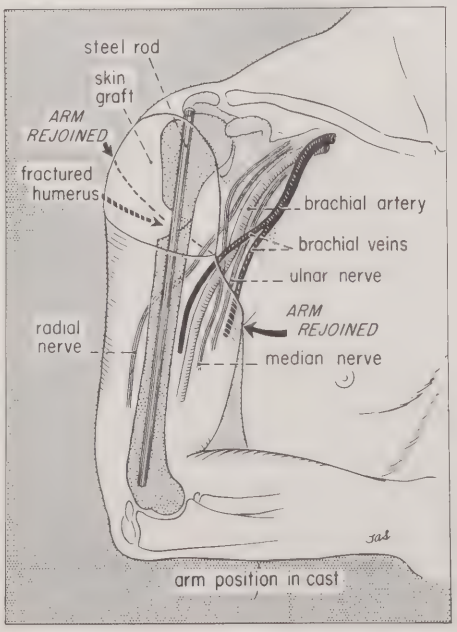
The only exception is a guillotine-like accident which cuts the nerves cleanly. In Everett's case his arm was wrenched from his shoulder, causing an uneven injury.

The team chose therefore to delay rejoining the nerves. They simply identified the three main nerve trunks and bound them together with a suture. When the nerves were to be rejoined at a later operation, the surgeons would have no difficulty finding them.

In a normal operation, at the start, surgeons remove dead tissues such as muscles and skin. Left alone these lifeless pieces become fertile beds for infection.

Reduce it to its simplest terms.

Until blood circulated through the reunited arteries and veins, the team could not tell how good the circulation would prove. Now, however, those damaged areas getting little blood became obvious.



Schematic diagram showing anatomy involved in rejoining of Everett Knowles' right arm

The surgeons then cut them out and sutured the remaining healthy masses of muscle and skin.

While the team was completing the replantation, nurses and assistants had been readying the adjoining operating suite. They wheeled Everett into that suite and began repairing the crushed fingers of his other hand. Grafts taken from his right foot supplied the thick skin needed to cover some of these fingers.

With the last stitch sewn a surgeon glanced at the clock. Eight and one-half hours had elapsed since the administration of anesthesia.

Five days later Everett returned to the operating room. Two raw areas of the injured right arm were ready to be covered by a partial thickness of skin from his right thigh. Within several days the grafted skin stuck fast and was growing.

Everett left the hospital three weeks after his admission. At home in Somerville his parents helped him move the joints of his right hand through their normal range, a therapy begun in the hospital. Another therapy at the MGH was to stimulate electrically his forearm muscles to maintain their tone while the arm was immobilized in a cast.

On Sept. 11, 1962, surgeons cut out the by-then apparent injured portion of the nerves and rejoined the healthy segments. Four months later Everett could contract his forearm muscles. His arm grew slowly stronger over the next three months and rapidly over the following three.

To provide him with sufficient ability to flex his shoulder, surgeons, now including Dr. William H. Harris, an orthopedist, transferred a tendon from his wrist to his upper arm. In June 1965, they fused his wrist and removed the rod which had held his separated bones together.

One month later Everett gave doctors a fright. He fractured his replanted arm and tore in his knee a type of cartilage called the medial meniscus. Once again good fortune followed adversity: the injury only made the original union firmer, and nature quickly healed the new fracture.

Related stories on pages 4, 5, and 6

Improvised Methods That Proved Wise

The procedure improvised 10 years ago for the world's first successful replant of a severed limb has stood the test of time.

In the comparatively brief period between Everett Knowles' arrival at the MGH and his entrance into the operating room, the team coordinated by a resident had already begun to innovate. While doctors were evaluating the problems, the amputated arm lay preserved in crushed ice, even today the preservative of choice.

To free the arteries and veins of altered blood, the team ran a solution (Ringer's) through the arm, still a treatment of choice.

The insight to delay cutting away dead muscles and skin until the restoration of circulation – the reverse of the usual operative technique – is followed even today. So is the decision to avoid rejoining nerves until a later operation.

Some modern refinements such as the use of microscopes to facilitate the joining of tiny veins and arteries of the wrist have made that task a little easier nowadays. But only one major procedure improvised 10 years ago is rejected at the present time.

"We joined the blood vessels first because we didn't know any better," said Dr. Ronald A. Malt, the surgeon who, as Chief Resident, coordinated the history-making team. "And then we were left with the prospect of doing the bones after the blood vessels.

"We had a difficult time protecting the blood vessels while all this orthopedic work was going on. That error in sequence is one that in subsequent surgery Dr. William H. Harris, Dr. John P. Remensnyder and I haven't made. Fortunately, it worked out satisfactorily anyway."

Another thing that has not changed greatly is the criteria for doing a replant.

An estimated 35 of the 800,000 patients entering the MGH Emergency Ward since Everett Knowles have been brought in along with major amputated segments of their arms. Yet MGH surgeons have chosen only one in five for replantation.

"With the vast majority of people, we don't even consider doing the operation," said Dr. Malt, who now heads the informal replantation team. The Harvard Medical School Associate Professor of Surgery and Chief of Surgical Gastroenterology at the MGH explained: "In certain carefully selected people, the fact that such an operation can give them an arm far better than any artificial one makes them very happy."

The amputated arm must be in good condition. The nerves must be capable of regenerating, and the muscles and tendons of functioning. Moreover the patient should be healthy and have no additional life-threatening injury.

Although the most suitable patients tend to be psychologically stable individuals under 30, older ones are sometimes accepted.

The surgeons have to turn down a number of people because their limbs are mangled far from the point of amputation. Major nerves that snap at a distance from that point cause many other rejections.

Some potential candidates lose a chance for replantation because major injury to internal organs threatens them.

What about the capabilities of the hospital and surgeons? The most important is a full understanding of the total picture of the combined surgical techniques and of the rehabilitation.

More than 50 successful replants have now been reported in the entire world.

Re-creation shortly after the Knowles operation showing a portion of the original team. Related photo appears on page 6.

A Carpenter Again; And a Husband-Hero

Everett Knowles was the historic first. But the MGH has recorded five other successes in seven attempts since.

One of the two most amazing was a 27-year-old carpenter who severed his left hand in a circular saw on February 17, 1967. He coolly picked up the hand, placed it in his apron pocket, and asked his foreman for help. The foreman nearly fainted.

Five years after replanting, the carpenter works full time in his profession in outdoor temperatures sometimes dipping to about –15 degrees Fahrenheit.

"His callused hand has excellent sensitivity to touch and pain," his surgeon reports. The patient recently astonished the surgeon by lifting a 150-pound desk a few inches with his replanted hand.

Another amazing success story is that of a 28-year-old Spanish-speaking workman who, on July 13, 1970, suffered an amputation of his left forearm on a rubber processing machine. The degree of damage made the replantation, largely a product of Dr. John P. Remensnyder's work, especially difficult.

Yet 10 months later when fire swept through his dwelling, he used his two hands to lift his family members out the window and into the waiting arms

of firemen. Now he is back working in the same factory where his accident occurred.

The oldest patient in the MGH series was a 60-year-old machine operator who severed his left wrist on Jan. 16, 1969, in an industrial paper cutter. He also lost three fingers of his right hand. His replantation was also largely the product of Dr. Remensnyder's work.

Now 63, he sweeps and shovels with his replanted hand and lifts small objects from a flat surface.

The second replantation tried was on a 44-year-old machinist who lost his right arm on September 5, 1963. After the rejoining procedure, he worked in a shipping room. He had regained sensation in the hand and his arm was progressing well when he died of an unrelated cause 19 months after the replantation.

One of the two replantation attempts that failed occurred Dec. 18, 1967. A 5-year-old son of a physician lost his hand in an escalator. Not surprisingly, the arteries and veins proved too severely damaged, and after 14 hours the surgeons reamputated.

The other failure came as a surprise. On November 7, 1969, a bookbinder's guillotine cut off the left forearm of a 24-year-old man. Because the cut was clean the surgeons anticipated this was the most likely type of replantation to succeed. Yet reamputation proved necessary when the rejoined blood vessels failed to allow the proper circulation because of an old obstruction in them.

Nineteen operations at another hospital for a previous condition may have resulted in the bookbinder's poor hand circulation before the accident.

A SKILLED TEAM

Taking part in the historic replant procedure ten years ago this month, in alphabetical order, were: Dr. George E. Battit, an anesthetist; Dr. Henrik H. Bendixen, an anesthetist; Dr. Bradford Cannon, a plastic surgeon; Dr. John P. Connelly, Resident in Pediatrics; Dr. L. Henry Edmunds, Jr., Assistant Resident in Surgery; Dr. Joan W. Flacke, Assistant Resident in Anesthesia; Dr. Dorothy Ford, Assistant in Physical Medicine; and Dr. Morten Grove-Rasmussen, Director of the Blood Bank.

Also, Dr. John M. Head, Assistant Surgeon; Dr. John B. Herrmann, As-

(Continued on Page 6)

An Arm and Not an Ornament

A car was streaking along the quarter-mile track last month at Epping, N.H., whipping up a cloud of dust in its 100-mile-an-hour wake. Hunched over the wheel sat a redhead – the same one who, as a freckled-faced kid 10 years ago, was wheeled into the MGH Emergency Ward, his right arm completely severed and the fingers of his left hand crushed.

Now both hands clutched the wheel as his car zipped over the track.

Everett Knowles has come a long way since surgeons gave him back his arm. By May of 1970 he held down two jobs, working 16 hours a day. The recession ended both of them but turned his hobby into an occupation.

"I had started working on cars when I was 15 or 16," Everett said, "and I liked it."

Now to earn a livelihood he does maintenance work at home on trucks. If things work out, he will develop this sporadic free-lance business into his own repair shop.

At the same time mechanical work remains a hobby. Everett owns a 1969 Ford Cobra he prepares for races. His interest in drag racing ignited in 1967 when he watched his buddies drag at the Epping, N.H., track.

"It looked like fun," he recalls. "Anyway I never could stand going somewhere and just watching without participating. I tried it. I got the feel of it, and I liked it."

In 1969, Everett acquired his Cobra and readied it for the competition at Epping. He won the first day he competed. The next time out he won and in the process broke the track record for his class.

Since then Everett has raced regularly, competing in New Hampshire, Rhode Island, and New York. Over the past three years he has won a number of races.

He uses his replanted right hand and arm for many more activities than clutching the wheel of his car. He plays baseball and basketball, and most important, uses it for performing mechanical work.

"Working on cars with tools has strengthened it," Everett said. "There isn't much dexterity. The power increase is amazing though."

Everett lifts 20 pounds with his replanted hand, and his callused right palm bears testimony to its rough use. He has good sensation to pain, and his sense of touch is good.

His rejoined limb causes no pain or limitation of movement.

While his right hand and arm lack the dexterity or power of his left, Everett is not troubled. He can't pitch the way he could as a Little League star, but playing first base in pickup games satisfies him.

"I can do anything I want," he said. "I'm really grateful for how things have turned out."

Today Everett Knowles uses his right hand in his work as a mechanic as well as his hobby of drag-car racing on eastern tracks.

Incredible Experiments Help Prepare Way

Some incredible experiments around the turn of the century helped prepare the way for the first successful replantation of a completely severed limb.

In 1908 Dr. Charles C. Guthrie of Washington University in St. Louis attached the head of one dog to the neck of another so that the dog had two heads. The transplanted head seemed to regain full consciousness.

The feat was achieved a half century before the Russians announced a similar "pioneering" operation of their own. Except for a few scientists, the world has been unaware of the unpublicized earlier achievement.

In fact Dr. Guthrie performed the experiment twice. His laboratory notes published in his 1912 book on *Blood Vessel Surgery* describe the experiments.

On May 21, 1908, he amputated the head of one moderate-sized dog and engrafted (transplanted) it to the neck of a second of the same general size.

At 3:47 p.m., 29 minutes after amputation, the circulation in the grafted head was restored. The following description is excerpted from Dr. Guthrie's careful laboratory notes:

4:30: First movement of nostrils noticed; color of tongue is pink.

4:31: Respiratory movements about two per minute.

4:32: Pupils contracting.

4:37: Respiratory movements continue at intervals of about 11 seconds.

4:39: Muscles of throat contract with respiratory effort.

4:46: Lids closed; pupils contracted; respiratory movements continue; tip of nose moist; tongue and mucous membrane red.

5:12: Respiratory movements (of grafted head) 10 per minute; respiratory rate of host (dog receiving grafted head) 60 per minute.

5:27: Respiratory movements stronger, and rate 14 per minute.

5:45: Temperature of both heads is 38° centigrade.

6:37: Respiratory rate of host 30 per minute; respiratory rate of engrafted head 24 per minute.

7:05: Circulation in engrafted head very active.

9:50: (Host head) drank water.

At 10:26 the next morning, when breathing became more labored, Dr. Guthrie put the animal to sleep. A small blood clot had caused the failing health.

Using a slightly different procedure, Dr. Guthrie tried the same experiment six days later with two dogs of the same size.

Some 90 minutes after the operation, the transplanted head gave evidence it could hear, see, and feel. Dr. Guthrie put the animal to sleep three hours after surgery.

Photograph taken in 1908 of transplantation of dog's head to neck of a second dog. (From *The Contributions of Dr. C. C. Guthrie to Vascular Surgery* published by the University of Pittsburgh Press.)

He and Dr. Alexis Carrel of the Rockefeller Institute, both independently and as a team, performed a number of other pioneering animal experiments in the joining of blood vessels. They also transplanted kidneys, limbs, thyroids, lungs, and hearts.

In 1905 Dr. Carrel wrote his colleague:

"I made also a series of new plastic operations on the big vessels. It is the beginning of new plastic surgery of blood vessels."

After going on to describe his animal work in transplantations, Dr. Carrel continued:

"It may produce not only the surgery of the blood vessels and hence of organs but also some interesting operations in general surgery."

Dr. Carrel's words were prophetic. The research of Guthrie and Carrel laid critical groundwork for both organ transplantation in humans and replantation of human limbs.

Surgeons remove old cast from replanted arm of Everett Knowles.

A SKILLED TEAM

(Continued from Page 5)

sistant Resident in Surgery; Dr. Lucian L. Leape, Jr., Assistant Resident in Surgery; Dr. Ronald A. Malt, Chief Resident in Surgery; Dr. David C. Mitchell, Assistant Resident in Orthopedic Surgery; Mrs. Judith Moberly, Staff Nurse, Operating Room; Dr. Murray K. Rosenthal, Assistant Resident in Pediatrics; Dr. T. David Seigne, an anesthetist; Dr. Robert S. Shaw, Associate Visiting Surgeon; Miss Judith Anne Spiers, Head Nurse, White 12; and Donald Upham, X-ray technician.

A New Chapter

(Continued from Page 8)

sailed for Europe to visit the clinics of London, Dublin, and Paris.

Returning home to Salem in 1830, he inherited the large medical practice of his father, who died shortly afterward.

The younger Treadwell began his collection of medical books and journals during his trip to Europe. According to the *Boston Medical and Surgical Journal* (August 21, 1856), "Dr. Treadwell was always a diligent student, and he employed a considerable portion of his means in collecting medical books."

The *Salem Register* of August 21, 1856, also commented in a eulogy that, "The deep stores of his knowledge were open to young students and brother Physicians – his books, his instruments, were theirs."

The younger Treadwell was forced to give up his active practice in 1839 soon after performing a postmortem on a child who had died of scarlet fever. It was believed Dr. Treadwell contracted the disease through a small open wound on his hand.

Whatever the cause, he spent most of the rest of his life at home, reading and indexing his books. His notes are preserved in four leather-bound volumes.

He never married. A Harvard classmate who visited him in Salem described him in a diary as "somewhat eccentric and rough," caring only for medicine.

The same journal which called him a diligent student also said, "His manners were eccentric and somewhat abrupt, but his kindness of heart and uprightness of character endeared him to all his acquaintances."

John Goodhue Treadwell died in 1856, thus setting in motion a chain of events which sent the books first to the Massachusetts General Hospital and now soon to Harvard. The legacy of historical medical knowledge will be available to all qualified persons at the Countway Medical Library, and the volumes can be returned to the MGH at the hospital's request.

Although a century has gone by, both the primary and secondary beneficiaries of Dr. Treadwell's will have benefited from the unusual turn of events.

Gerard Serou says good-bye to nurses Gerry Moylan, RN, center, and Barbara Morrocco, RN, right, as he leaves Children's Service for France.

Achieving Good Health for the Very Young

(Continued from Page 1)

Next it is joined back to the bladder in a way which prevents backwash. This anti-reflux or anti-backwash technique was devised by Dr. Wyland F. Leadbetter of the MGH about 15 years ago.

If both ureters require surgery, it can be done in one operation. Sometimes the upper part of the ureter also requires repair. Then the surgeon performs a similar repair several months later to straighten out and trim down the upper end.

As is generally true in repeat surgery, Gerard's operation was more complicated than most and lasted six hours.

Gerard is the youngest of eight children, seven of them boys. His father drives a bus, and his mother works for a tugboat firm in Marseilles. The cost of the trip to Boston and of his medical expenses would have proved staggering to Gerard's parents.

Mr. Andre Blohorn, the Director General of the Societe Provencale de Remorquage of France, the firm which controls all French tugboats, paid the entire expense. Included was a round-trip airplane fare for Gerard and his mother, who stayed at a nearby hotel, and a surgeon from Marseilles who came to observe the operation.

"We are so grateful to both Mr. Blohorn and to Dr. Hendren," Mrs. Serou said.

Gerard, whose illness prevented him from playing before, is looking forward to games by the sea he loves so much. Although he is a little young to be choosing a profession, he has dreamed of one day becoming a veterinarian and helping animals as physicians have helped him.

Gerard is one of about 75 children whose megaureters have been refashioned at the MGH to provide them with the potential for both a healthy life and a normal life-span. Other hospitals in Europe and the United States have adopted the same general technique.

In the hands of a skilled surgeon the procedure is in extreme cases performed even for children less than one year old. Otherwise these infants with severe obstruction sometimes die within a few months.

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A New Chapter for Old Treadwell Books

It took more than a century, but a new chapter involving old medical books has been written in the aftermath of a strange will. It was over 100 years ago that the President and Fellows of Harvard College voted to decline a bequest from Dr. John Goodhue Treadwell. Securities, land, and a large collection of medical books and journals were rejected because of the "unusual and embarrassing conditions attached to it."

The conditions of the will were intricate and unusual. Embarrassing, however, is a word we would probably not use today to describe the difficult stipulations. He wished to establish professorships of anatomy and physiology at Harvard but made many impossible provisions.

The doctor must have had some inkling that Harvard would find his conditions unacceptable, for he instructed:

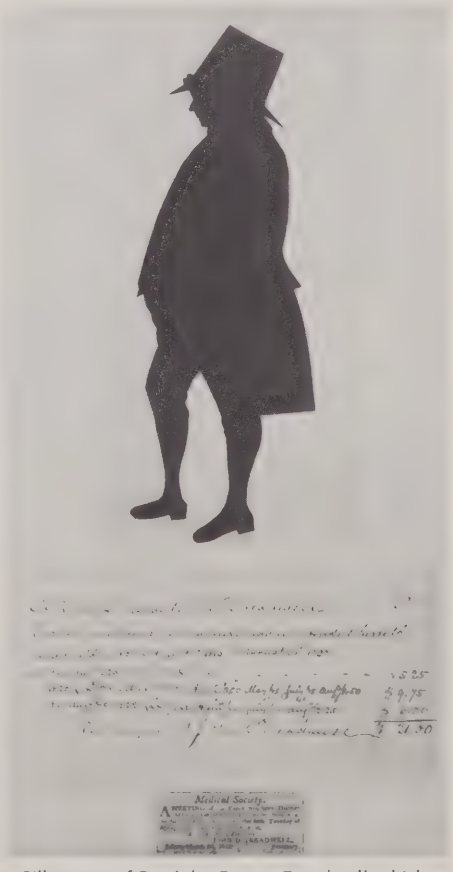
"In case the President and Fellows of Harvard College refuse to accept the books herein bequeathed to them, or neglect or refuse to comply with the conditions herein annexed to said bequest, then I give and bequeath the same to the Massachusetts general hospital corporation [sic], and their successors, forever; to be by them held, in trust, for the use of the physicians and surgeons of said hospital and their successors. . . . And I direct that the sum of $5,000 be specially set apart . . . as a library fund."

The MGH Trustees voted in March 1858 to accept the bequest. Around this collection of 2,500 medical books and journals, called the Treadwell collection, has grown the present Treadwell Library of 38,500 volumes now under the guidance of the present Librarian, Miss Genevieve Cole.

"This library of medical books and periodicals," said Miss Cole, "is amazingly well balanced. It includes books and journals covering the whole spectrum of medicine and surgery as well as chemistry, physiology, and the history of medicine.

"Many of these were written by famous physicians and surgeons who were contemporaries of the Drs. Treadwell, and a few were members of the MGH Staff.

"This collection remained in the MGH for almost forty years without being cataloged. Although the checking of individual books against the inventory made by Dr. John Goodhue Treadwell's lawyer is not yet completed, it is evident that none of them has been lost."



Silhouette of Dr. John Dexter Treadwell which hangs in the MGH library named for his son, Dr. John Goodhue Treadwell. One of the elder Treadwell's bills for $21 covering a three-year period is displayed, as well as a newspaper clipping, dated March 20, 1812. It is signed by John Dexter as President of the Essex Southern District Medical Society.

Last December the MGH Trustees again made a fateful decision concerning the collection. The volumes – many of them old (dating to the sixteenth century) and fragile – are to be transferred to the Countway Library of the Harvard Medical School.

With its ample space and special rare book section, the Countway can accommodate the collection (given on an indefinite loan basis) in a temperature- and humidity-controlled area which the library at the MGH lacks.

These books and bound journals were the acquisition of two Treadwells, father and son.

The father, Dr. John Dexter Treadwell, was born in Lynn, Mass., in 1768. After graduating from Harvard College at the age of 20, he studied medicine for three years under Dr. Edward A. Holyoke of Salem.

He practiced in Marblehead for a short while before establishing a large and active practice in Salem. Married to Dorothy Goodhue in 1804, he lived in Salem until his death in 1833.

Many of his books, written in Latin and Greek, attest to his proficiency in those languages. He was a Fellow of the American Academy of Arts and Sciences.

In 1803 he was largely responsible for the drawing up of an act passed by the Massachusetts General Court which reorganized the Massachusetts Medical Society.

His only child, John Goodhue Treadwell, was born in 1805. Like his father, he attended Harvard College, graduating in 1825. The next three years were spent studying medicine under Dr. William Johnson Walker of Charlestown. After attending lectures in New York and Baltimore, John Goodhue

(Continued on Page 7)

MGH News

Vol. 31 No. 6 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS June-August, 1972

North End Unit: Total Commitment to Health Care

A Strange Emphysema That Attacks Children

A strange form of emphysema that can attack children is undergoing intensive study at the MGH.

Even in heavy smokers emphysema rarely strikes before middle age at the earliest. This particular type, however, attacks people in their 20s and 30s and in one case confirmed by the MGH apparently struck an 18-month-old girl.

Called alpha$_1$-antitrypsin deficiency, the disease is inherited. Women and men stand an equal chance of developing it; in contrast the common type affects mostly men.

The deficiency-related disease creeps up subtly. Instead of beginning with a long history of heavy coughing and sputum production, it often causes neither of these symptoms in its early stages. It usually starts with breathlessness that progressively worsens.

Such was the case with the 18-month-old child believed the youngest ever to contract emphysema. Unfortunately when this girl from St. John's, Newfoundland, first developed breathlessness, physicians had not yet discovered alpha$_1$-antitrypsin deficiency.

Besides the start of breathlessness she had a chronic cough and a little wheezing. None of these symptoms seemed severe enough at that early age to take her to a physician. Yet in retrospect, the chronic dry cough and wheezing suggested that the lung disease had already begun.

At about 2 years of age she nearly died from a severe bout with measles complicated by pneumonia. Although she recovered, the measles-pneumonia combination may have accentuated her emphysema.

Her lung condition worsened, but careful hospital studies in St. John's left doctors baffled. At about age 5 further tests in Toronto's Hospital for Sick Children were of no avail. However, one surgeon who obtained biopsy material from her lungs commented that they looked like those of an adult with emphysema. Impossible, he thought, and the others agreed.

That was just about the time that two Swedish researchers, Drs. Carl-Bertil Laurell and Sten Eriksson, were

(Continued on Page 2)

Carol Langley, Senior Supervisor of Alpha$_1$-Antitrypsin Reference Laboratory, examines a slide for identification of the substance. Inherited deficiency of this protein is associated with the development of an unusual form of emphysema to which children are susceptible.

A frail-looking elderly patient empties wastebaskets at the North End Community Health Center. To show his appreciation, the husband of another patient washes and waxes the floors there every week.

When the center observed its first anniversary on April 26, some patients sent bouquets of flowers.

That's the way things are at the health unit which has an MGH medical flavor. The project director washes the bathrooms; the nursing and administrative personnel clean the rooms before starting their daily work.

"It's such a total commitment to health care," said Charles Schwager, a University of Michigan graduate student in public health who serves as the center's Executive Consultant. "I've seen health centers in New York and others in Boston, and they are just different."

The administrators operating the clinic are residents of the North End. Their salaries are low, but their spirits are high.

Physicians with MGH staff appointments treat the patients and advise about medical policy. However, the center retains final authority, and it is the North End residents who decide what medical services to offer, how to finance them, when to schedule them, etc.

In his role as Medical Director of the center, Dr. Thomas C. Peebles, Assistant Chief of the MGH Children's Service, assists in policy decisions and with funding problems. Freed from other administrative responsibilities, he concentrates on matters directly related to the delivery of health care.

(Continued on Page 4)

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EDITORIAL:

Monument to a Community's Dedication

The North End Community Health Center described in a page 1 article is a monument to a neighborhood's dedication. Operating on a limited budget, jammed into small quarters, equipped with pickup furniture, the unit has proved an unusually successful operation.

To be sure the North End is an extraordinarily close-knit ethnic community. Therefore much of what makes the center itself successful may not prove applicable to other neighborhood facilities. Nevertheless Tim Rogers, Master of Public Health from the University of Michigan and the center's first Project Director, believes that some lessons can be applied to other incipient units.

The first is consumer orientation by other consumers. In other words, the neighborhood should be educated about its health-care needs, and a cadre of people within the community should be trained to educate their peers. The second applies especially to any community which has even a minor ethnic identity. "It's really important," Mr. Rogers said, "that people from the community work in the center. I'm just so convinced that there is so much talent out in these communities to fill every level from caretakers right to administrators and directors." He said that if carefully chosen, these individuals can often be trained to perform in their own neighborhoods administrative and other nonmedical tasks just as well as highly educated administrators.

Perhaps another lesson to be learned from the North End is the care with which the community screened its physicians. In an era in which top physicians are scarce in less affluent neighborhoods, it may seem a luxury to seek a pleasant personality as well as medical expertise. Yet this added fillip may prove critical to the way a neighborhood reacts to a health center.

The attempt to make the North End Health Center self-supporting is of fundamental importance. Funding has proved the most persistent problem for community health-care units. Without a seemingly bottomless pit of money, most establishments would collapse. By paring costs and making charges realistic, the North End center has survived its first anniversary with only moderate financial aid from several public and private sources. As yet, however, complete self-sufficiency has not been achieved. Upward revision of Medicaid rates allowed the center would push the project closer to economic autonomy. Aside from Medicaid, striking a balance between rates a worker without adequate health insurance can afford and those needed to make the unit self-sufficient is a delicate high-wire act. If the North End achieves this, it may become a fiscal model. The center may already be a model for the quality of its care and the friendliness with which it is rendered.

A Strange Emphysema That Attacks Children

(Continued from Page 1)

first publishing in Sweden their discovery of alpha$_1$-antitrypsin deficiency.

When at age 13 the child returned undiagnosed to Toronto, the Swedish research was better known. Dr. Henry Levison suspected that emphysema related to the inherited deficiency might be her problem. He sent blood serum samples to Dr. Richard C. Talamo of the MGH Children's Service.

An expert on the disease, Dr. Talamo confirmed that she was severely deficient in alpha$_1$-antitrypsin. The surgeon who noted the resemblance to emphysema six years earlier had been correct; incredibly the girl's symptoms at age 18 months were in all likelihood caused by the early stages of the disease.

Dr. Talamo brought his team to St. John's and in a two-day period drew blood samples from the 55 members of the girl's family and studied their inheritance pattern.

This was his second such field trip. In 1966 he and Dr. K. Frank Austen, now Professor of Medicine at the Robert B. Brigham Hospital, had become interested in the disease. Dr. Talamo studied the serum of 106 persons belonging to the families of alpha$_1$-antitrypsin deficient patients of Dr. John Allen, a Seattle physician. Dr. Talamo, a Harvard Medical School Assistant Professor of Pediatrics, is continuing his research on the inherited problem.

A year ago, the MGH became one of two reference centers in the country to study the disorder for the National Heart and Lung Institute of the National Institutes of Health. The second center is at Washington University of St. Louis.

Visitors from a number of institutions have come to the MGH to learn how to determine the amount of alpha$_1$-antitrypsin in a patient's serum. They are setting up the standardized procedures in their own laboratories.

Dr. Talamo is also developing methods to make the MGH a quality-control center where investigators from other hospitals can send questionable samples for analysis.

"The National Heart and Lung Institute," he said, "is so interested because this is a kind of emphysema that

may be chemically identifiable in the blood. It might be amenable to public-health measures, and if treatments for it become available, it would certainly provide a nice answer for a lot of people with emphysema, although it would admittedly be a small percentage of the total number of people with the disease."

At present no treatment to arrest lung damage exists. Thus at age 15, the Canadian girl is still alive, but her condition continues to deteriorate.

One obvious solution would be to replace the missing alpha$_1$-antitrypsin which is a protein.

"Unfortunately it doesn't stay in the circulation very long," Dr. Talamo explained. "Half of it disappears in three days. Knowing that the disease might not develop until age 30, one would have to give tremendous quantities at very frequent intervals to achieve any protection."

A second seeming possibility stems from the fact that the birth-control pill causes elevations of the protein. But people severely deficient in it fail to derive much of an increase from the estrogens contained in the pill.

Since the disorder has been discovered comparatively recently, many new patients are expected to be diagnosed.

An estimated 1 in 100 MGH Clinic patients with emphysema or chronic bronchitis suffers from the protein deficiency. Another MGH study indicates that about 1 in 25 Bostonians carries a single gene (a unit of heredity) for severe alpha$_1$-antitrypsin deficiency. Should two carriers marry, each of their offspring would bear one chance in four of being afflicted with the disorder.

"In terms of inherited diseases this protein deficiency is very common," Dr. Talamo said.

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Unusual Emphysema Key to Common Type?

Many investigators believe that unlocking the mystery of the strange type of emphysema which strikes young people may explain how the more common form works.

Their studies are complementing research on the conventional disorder (January 1972, *MGH News*).

The recently discovered form is associated with a deficiency of the serum protein called the alpha$_1$-antitrypsin. In normal people this protein has turned up in all the body secretions in which it has been sought to date.

Dr. Richard C. Talamo's MGH group has found it in tears, urine, mother's milk, blood, saliva, cerebrospinal fluid, lung secretions, and the amniotic fluid enveloping the unborn child.

"If it's present everywhere," Dr. Talamo said, "perhaps it is necessary everywhere. It might mean that it is essential for preserving tissue structure."

That is a hypothesis, a scientific guess not sufficiently tested to be called a theory. What is fact, however, is that the lungs contain a number of enzymes, substances capable of destroying lung tissue. Also known is that other substances can prevent or inhibit this action.

Alpha$_1$-antitrypsin appears to be the major inhibitor. In the test tube at least, this protein inhibits very well the two enzymes most capable of destroying lung tissue.

"People who have a severe deficiency of alpha$_1$-antitrypsin," Dr. Talamo said, "would not be able to respond to the enzymes the way normal people can. In turn this may result in tissue damage as time goes on.

"Obviously it may take many years before the damage occurs, and the tissue most likely to be affected is the lungs."

Emphysema, however, is not the only disease that develops in people born with this protein deficiency. A smaller percentage acquire cirrhosis, a disease that causes destruction of the liver cells.

Those with cirrhosis associated with the protein deficiency develop the illness in infancy. In one family two children acquired both lung disease and cirrhosis.

The mystery of the protein extends beyond its role in these two disorders. In normal people it seems to double or triple in response to any disease in which there is acute inflammation: upper respiratory infection, pneumonia, arthritis, inflamed skin, a burn, etc.

During pregnancy the amount also doubles or triples. And for unknown reasons the level also rises significantly among women taking the birth-control pill.

Part of the process in measuring protein deficiency associated with unusual form of emphysema

North End Unit: Total Commitment to Health Care

(Continued from Page 1)

"The growth rate has been spectacular over the first year," Mr. Schwager said. "We had about 7,000 medical and dental patient visits over the first year."

A little more than half the 500 nondental patients now treated each month have been there before. Another 200 receive dental care each month.

"The repeat visits really tell the story of community reaction," observed Mrs. Elaine Wilson, Project Director.

Mrs. Wilson believes the center has the least expensive per patient cost of the more than 30 such programs in Boston.

The center's reputation is beginning to spread, and visitors from as far as California have come as observers. In April Mrs. Wilson spoke at the University of Michigan on the activities involved. According to some, the unit may develop into a model.

How did it reach its present state? Until the center's birth a year ago, the North End had 10 physicians for 11,000 people. Only two of the doctors had graduated from an accredited medical school. Of the two only one had any hospital affiliation and that, with a nonaccredited institution.

If a patient required hospitalization, he almost inevitably was admitted to a hospital where his own physician could not participate in his care.

Adding to the problems, transportation to the MGH was poor, and taxicab drivers often refused to make the trip because of the low fare.

About two years ago a representative of the Boston Department of Health and Hospitals asked at a community meeting whether the North End had a health need. Those attending said yes.

A little later, Tim Rogers, then a University of Michigan master's degree candidate in public health, came to the attention of Dr. Thomas S. Durant, an Assistant Director of the MGH. Mr. Rogers was looking for summer fieldwork, a specialist in search of a project.

Dr. Durant introduced him to the North End group, and a love affair with the community was ignited. Mr. Rogers plunged into his new role with the intensity of a jackhammer.

With the MGH helping him to plan appropriate action, he tore into the difficult work himself. At the same time women of the North End and several older men used every money-raising device they could think of to scrape funds together.

"One of the key philosophical concepts that I started with two years ago," Mr. Rogers recalled, "was that a place like this could be completely community controlled after the organizational stage.

"I felt from the beginning that a lot of my task was to work myself out of a job; to train community people to take over various segments of my position."

What special situation did the North End present? It is a closely knit Italian neighborhood which retains the flavor and aroma of Italy: outdoor markets, rabbits and lambs dangling in meat store windows, knots of men chatting in Italian on Hanover Street sidewalks, some of the best pasta this side of the Atlantic Ocean, and coffee shops featuring espresso, capuccino, and conversation.

For the most part the community's unusual closeness eased the development of a health center. In some ways, though, it hindered progress. Like most tightly tied neighborhoods, this one has a sharply defined, highly developed power structure which had to be considered.

Community participation traditionally means involving clergymen, politicians, big businessmen, and the like. Mr. Rogers approached the subject from another viewpoint.

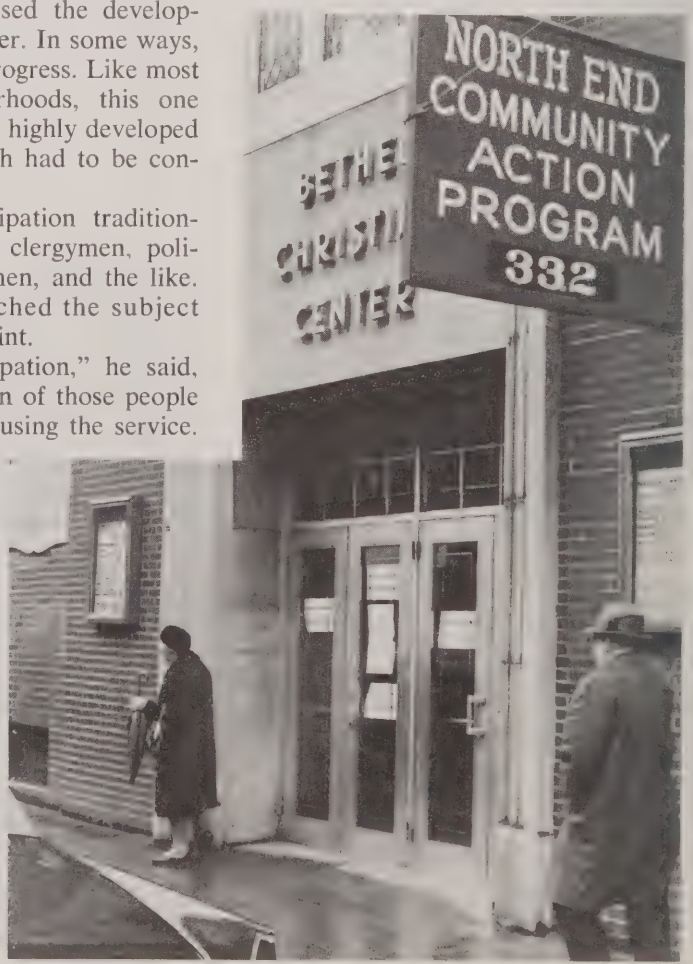
"Consumer participation," he said, "is really participation of those people who are going to be using the service. In a setting like this, it's the mothers, their husbands, their kids, and the senior citizens. They have one goal – to get good care."

Mr. Rogers brought to the North End some expertise in economics, medical-care delivery, and power structure. But it was the community itself that furnished expertise about cultural factors in the neighborhood, the language, the special needs, etc. – considerations vital to whether the people would seek care in a new program. To this knowledge was wedded a near religious fervor on the part of a few for the new undertaking.

The 15 or so most dedicated workers formed a consumer board of directors, called the North End Community Health Committee.

Originally naïve about the political, economic, and governmental problems, they learned by accompanying Mr. Rogers to meetings with various public and private agencies and through the efforts of physicians like Drs. Peebles and Durant.

Mr. Rogers and, at times, adminis-



North End Community Health Center

trators like MGH Associate Director Henry J. Murphy helped lead them through a field of bureaucratic stumbling blocks. Occasionally the governmental red tape required a sword of Damocles to slice through it.

By constant pressure the community made various organizations accountable to its needs. The man in the street was not averse to the accountability concept either, sometimes stopping a board member and demanding new services.

Just how knowledgeable about health care did the laymen operating the center become? Mr. Schwager replied:

"We have people from the federal government and from the city's agencies who admit that some of the board members here are among the most sophisticated health consumers around."

The consumer board relies on Dr. Peebles to recommend medically skilled physicians.

But because of the sensitivity of the North End residents, the board screens carefully any physicians who wish to serve in the unit.

"When we hire people," Mrs. Wilson said, "we screen them for their warmth and personality. We don't care if a doctor was an A student in medical school. If he's going to turn patients off, he's going to be an A student sitting in a room all by himself."

With one exception all the physicians have MGH staff appointments. If a patient requires admission, the same doctor who treated him in the North End cares for him at the MGH. Mrs. Marianne Pepicelli, a resident of that section, said of the clinic and the hospital follow-up care:

"They treat you as though you had a million dollars to pay them, and they spend all kinds of time until you understand everything, and until you feel better and understand why the medicine is given."

Most of the physicians work together in a loosely structured group and divide their schedules among the center, the MGH, and a neighborhood health center also headed by Dr. Peebles in the Weston-Waltham area. Most also teach at Harvard Medical School.

"I think we have been exceptionally fortunate in the quality and the kind of physician that we have here," Mr. Rogers said. He added that the diversity of work in several different types of organizations stimulates their interest as does the gratitude of the North End residents.

Dr. Zareh N. Demirjian of the MGH examines Mrs. Erminia Otolo at the North End center.

"Going to the North End is my real joy," Dr. Peebles said. "The doctors there work very hard, but the spirit of the patients and nonmedical staff just pervades the place."

As Medical Director, Dr. Peebles has the overall responsibility for medical care, while the community board decides all other policy matters.

When it comes to knowing the medical needs of the community, however, usually the board members know best.

"At the start," Dr. Peebles said, "I felt we shouldn't add internal medicine until we had been going at least five months, and I was wrong. The need was overwhelming as the board had anticipated. And so we started up these sessions after a little more than a month's operation."

It was also the board's insistence that the older patients would require additional podiatry services. As it turned out, the amount of foot care needed in the North End far exceeds normal requirements. Even with expanded podiatry sessions, the demands of aching feet still exceed the supply of foot specialists.

Most of the education, however, took the other direction with the medical staff and Mr. Rogers educating the community. Assistant MGH Director Durant said:

"The board has learned the cost of ambulatory care, how to deal with multiple agencies – private, state, and federal – and the bureaucratic red tape. They've also developed enough rapport with the community to sell the fact that ambulatory care costs money and cannot be delivered at a profit."

Even so, economics protrudes its head as the principal irritant in the community.

"Our major complaint," Mrs. Wilson said, "is that our costs are so high. Compared to the other health-care centers, they're not high. But a majority of people in the North End, who are the working poor, just can't afford it."

For those who cannot pay, the charge is scaled down or omitted. Intense pride keeps many North Enders from seeking special concessions, for themselves or their families.

Family care is an important element in the North End Community Health Center. Executive Consultant Schwager explained it this way:

"We don't want to be a private physician's office where you come in, see a doctor, and leave. We want to provide care for a person acknowledging the fact he is a member of a family and that a family is part of a large society, and there are a whole series of health needs. Some needs are associated directly with the physician, some with environmental factors."

While MGH staff doctors care for medical needs, the community dental health program of the Boston Department of Health and Hospitals looks after dental problems. Dr. Myron Aleukian, who directs the community program for the City of Boston, is both a dentist and a public health school graduate.

Miss Livia Cenerizio is Administrator for the North End center and Miss Lillian Leone, Pediatric Nurse Practitioner.

Though everyone concerned exults at the progress, the center faces a variety of unmet needs. When it opened a year ago, the MGH donated old furniture from its former extended-care facility in Lincoln. Among the items of

(Concluded on Page 6)

TOTAL COMMITMENT

(Continued from Page 5)

furniture still required is a reclining podiatry chair. The older citizens have difficulty climbing onto the present one which resembles an electric chair.

A more critical need is for expanded quarters. Artists from Boston's Summerthing decorated the walls of the present Hanover Street location which is in a building belonging to the American Baptist Association. MGH maintenance crews renovated the quarters at cost. Now the walls are bulging from the increased activity.

"We're really struggling for space," Mrs. Wilson said. "We're hoping the city can help us."

Dr. Peebles lists X-ray facilities, eye services, and additional podiatry as the major unmet medical needs of the moment. He also envisions a closer tie between health care in the school system and that in the center.

And these are considered conservative estimates because he has maintained a strict policy of not adding services until the need was proved. In this way he has helped pare costs.

In the long run, the major question is the same one haunting all independent health centers: money.

"I'm amazed at some of the things that have happened here," Mr. Rogers said, "because it is very close to being economically viable. A lot has to do with Dr. Peebles and his approach to the practice of medicine with physicians from the group part-time in the center and nurse practitioners the focal point of care. Utilizing a lot of other allied health workers, they increase the efficiency of the physicians and at the same time lower the cost of care.

"That's been crucial, especially the nurse practitioner concept, because she sees a lot more people that formerly a physician would have had to see, and much of the work she does would not be a challenge to the physician.

"Despite these measures long-term economic viability is the only major problem. Unless a whole system of Medicare, Medicaid, third-party people, and the federal government which is funding such programs can get themselves together, just where is the money coming from?

"If the money is here, these people will keep the center operating in a really exceptional way."

Artistic touch to walls of waiting room entertains young patients at the health center.

A GREAT MANY HELPED

Among those who helped the North End Community Health Center get started were several physicians.

Besides those mentioned in the main article are Dr. Nathan Talbot, Chief of the MGH Children's Service; Dr. Andrew D. Guthrie, Jr., Chief of the Ambulatory Division of the MGH Children's Service; and Dr. John P. Connelly, Director of the MGH's Charlestown-Bunker Hill Health Center. Dr. Cyrus C. Hopkins, then Chief Resident in Medicine at the MGH, took part in initial sessions, and Dr. John H. Knowles, former General Director, encouraged the MGH participants.

Lewis Pollack, Assistant Deputy Commissioner, and Dr. Jonathan Fine, Director of Community Health Services, both of the Department of Health and Hospitals in Boston, played an important role for the city.

For the North End the entire board of directors has continued to perform a central role.

Imaginative mural menagerie intrigues this little girl.

A Working Library Dating Back to 1500

(Last month the MGH News *reported the loan to the Harvard Medical School's Countway Library of a collection of old medical books. In this article some of the more unusual books in that collection are described.* EDITOR'S NOTE.)

After lying untouched for more than a century, the recently cataloged "Treadwell" medical book collection has turned up many rare and unusual volumes recording practices of both Eastern and Western medical worlds.

The collection was originally bequeathed to the MGH by John Goodhue Treadwell, a nineteenth-century Salem physician.

The earliest of the volumes in this group, now in its new home in Harvard's Countway Medical Library, is the *Canon de Medicina,* printed in Venice in 1500. The author, Avicenna (Abu 'Ali al Hussein ibn Abdullah ibn Sina), was an Arabian philosopher and physician born about 980 A.D.

As late as 1914 versions of Avicenna's work were used as texts in Persia, Arabia, and India. The Treadwell edition was translated from Arabic to Latin by Magisto Gerado Cremonensi in the fourteenth century. Translated into both Hebrew and Latin, it was printed in over 30 editions in the Latin versions.

The Treadwell copy lacks its outer covers, but the pages are surprisingly intact – white, with heavy, clear black type and large bottom margins. Interspersed throughout the double columns of type are large decorative capital letters.

The book is divided into five sections dealing with physiology, pathology, hygiene, treatment of disease, and preparation of remedies.

Another popular subject for translation into various editions was the Aphorisms of Hippocrates, the Greek usually considered the father of medicine. The Treadwell collection contains several of these volumes.

Included in the collection are anatomical atlases and textbooks on every imaginable medical subject. For Dr. Treadwell the books were not merely a collection – they were a working library, used diligently and often in the course of his medical practice.

Reorienting Ph.D.s to Human Disease

(Continued from Page 8)

"This interaction with other people in different areas," Dr. Zielke said, "was just the kind of thing that I wanted for my second postdoctorate, so I was very pleased. I thought being in a hospital would be the best location for the future goals I had in mind."

Last fall all four Ph.D.s participated in a course called Problems in Developmental Medicine. Drs. Warshaw, Littlefield, Gross, and Malt, as well as other physicians and scientists, contributed their particular areas of expertise. Some first- and fourth-year Harvard Medical School students also took the course, which was given three times a week.

During the spring, weekly seminars were held with speakers from various laboratories within the MGH and experts from outside. The speakers presented their own data to the group and reviewed problems in progress in their research.

"I think the whole advantage to this kind of program," said Dr. Warshaw, "is the development of a structure and some opportunity for interaction that the Ph.D.s otherwise wouldn't have. The course and seminars are a mechanism by which different people in different labs get together. It serves a communications function within the hospital."

Dr. Hill, whose prior training is in pharmacology, had a strong background in certain clinical areas before he came to the MGH. He feels the course on developmental medicine has helped him to see other clinically related problems.

"Your research is always the sum knowledge of what you know and how you use that knowledge," he said. "We were exposed to a diversified body of clinical information. We each may have gained different insights from the training format that will hopefully aid our own research."

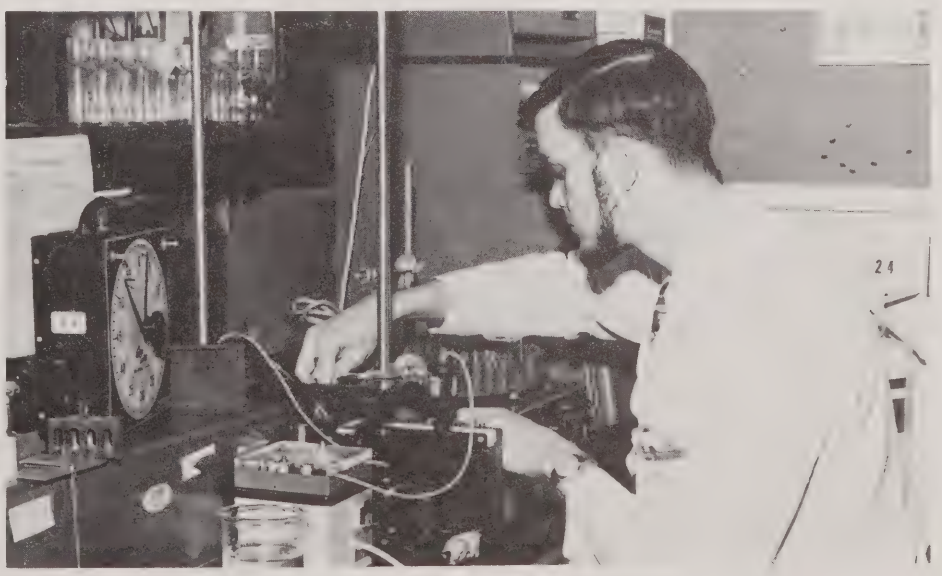
Dr. Linsenmayer agrees.

"The MGH is the best of all possible worlds," he said, "in that there are enough people in basic research that you keep your contacts, yet there are so many people working in medicine that their viewpoint rubs off.

"I feel now that if someone wanted to collaborate with me on a problem of human disease I would be willing to tackle it, whereas before I would have had to say 'sorry, I don't work on those kinds of things.' The course has modified my thinking."

If the intent of the program is to broaden the training experience of Ph.D.s and expose them to medical problems while interacting with others in a hospital environment, it would seem to have succeeded with the four men now in the two-year program:

"Hopefully these people are going to come out with strong interests so that they will want to continue to do medically oriented research," said Dr. Warshaw, "and will find in this program a variety of learning opportunities to bring their training to bear on human problems."



Dr. James M. Hill is analyzing biochemical changes which trigger growth in a kidney.

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Reorienting Ph.D.s to Human Disease

A new program begun last summer has brought four Ph.D.s to the MGH to continue postdoctoral research training in areas that may someday yield benefits in the battle against human diseases.

Dr. Joseph B. Warshaw, Director of the Pediatric Developmental Medicine Laboratory and an Associate Pediatrician at the MGH and Shriners Burns Institute, is director of the new program.

"What we wanted to do," said Dr. Warshaw, "was to create a training format in developmental medicine and biology that would bring Ph.D.s and M.D.s together into one common training pool. This was done with an eye toward developing investigators who would come into clinical departments of medical schools and hospitals and be able to work with physicians on problems that were of mutual interest. Ideally these problems would have some clinical importance.

"There are fewer new M.D.s interested in medical research. They are entering areas of health-care delivery, social medicine, and systems organization. They are getting out into the community. This is going to leave a gap in terms of who is going to be doing medical research that traditionally has been done by M.D.s."

Under a grant from the National Institutes of Health, these postdoctoral fellows have been attending classes and seminars at the hospital, as well as carrying on research in four distinct areas, reflecting their individual interests and backgrounds.

Four research laboratories and their respective directors at the MGH and Shriners Burns Institute provide the major coordinated experience within the program. Besides Dr. Warshaw, Drs. John W. Littlefield, Jerome Gross, and Ronald A. Malt direct the active research programs involved.

By exposing Ph.D.s who have training in nonmedical areas to the vocabulary and existence of disease processes, Dr. Warshaw hopes that they will develop medically oriented investigative careers.

Brian J. Coyne, Ph.D., Research Fellow in Pediatrics in Dr. Warshaw's laboratory, is a theoretical biologist and spent two years at Yale's Department of Biology before coming to the MGH

Dr. Joseph B. Warshaw leads seminar discussion group of four postdoctoral researchers. Seated at table, from left, are Drs. Brian Coyne, Thomas Linsenmayer, Ronald Zielke, and James Hill.

"I felt," said Dr. Coyne, "that this program would give me a good opportunity to become involved in an area which would be medically relevant and give me an opportunity to develop my own ideas. Since I had been doing strictly theoretical work, I wanted to get experience doing experimental work.

"I felt that to be effective in theoretical biology I would either have to have my own laboratory facilities to determine the gaps in knowledge that are necessary to develop theory or be able to work with someone doing experimental work."

James M. Hill, Ph.D., Research Fellow in Surgery, is investigating biochemical changes which trigger growth within one kidney when the other kidney has been removed. His research is directed by Dr. Malt.

Thomas F. Linsenmayer, Ph.D., Research Fellow in Medicine, believes the program has modified his thinking and broadened his outlook.

"It has introduced me to the hospital environment and the types of research that can be applied to human biological problems and diseases," he said. "I would probably never directly have thought about medical problems with my basic research orientation, mainly because I wouldn't have been in an environment where this was done. Now I've picked up a number of problems mainly in the connective tissue area."

Dr. Linsenmayer is working in the Developmental Biology Laboratory of Dr. Gross.

"As a Ph.D.," he continued, "I met a number of people in the hospital environment I wouldn't have been able to meet otherwise."

Ronald Zielke, Ph.D., Research Fellow in Pediatrics working in Dr. Littlefield's Developmental Genetics Laboratory, also is appreciative of his expanded opportunities to meet a wide range of physicians and researchers.

(Continued on Page 7)

MGH News

Vol. 31 No. 7 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS September, 1972

Test Begins on Drug for Common Bone Disease

The Evolution of a New General Director

Some people journey through life never quite deciding what they really want to do. Others choose a profession early and never waver.

Charles Addison Sanders decided early – very early. The man who this month became the 17th MGH General Director in 151 years was 4 years of age when he announced he was going to become a physician. From that moment his father called him "doc," and no one who knew the boy ever doubted him.

His mother recalls that this determination to become a doctor arose about the time he witnessed a frightening incident. One of his little cousins was playing in the Sanders' yard in Dallas, Texas, when a stray dog bit the girl on the hand. En route to a veterinarian, the dog sank his teeth into virtually the same spot on Mrs. Sanders' hand.

When the animal proved rabid, both Mrs. Sanders and the girl received shots. Mrs. Sanders escaped rabies, but the girl died.

The incident etched itself indelibly on the boy's mind, but whether it made him resolve to become a physician neither he nor his mother knows. In the ensuing years he required rabies shots himself on several occasions. In the process he got to know and like his pediatrician, Dr. Benjamin Berger. The idea of helping sick people increasingly intrigued the child.

"Whenever there was someone with a splinter or the like," Mrs. Sanders recalls, "Charles was always the one who wanted to take care of him."

His mother repeatedly emphasized the need for being considerate of others. It was the opportunity to help other people and the challenge of problem-solving in fighting disease that most appealed to him about medicine.

If his mother showered compassion on people, his lawyer-father epitomized perseverance and the Protestant work ethic.

"I never got an allowance per se," Dr. Sanders remembers. "My father insisted that both my brother and I make our own money from the time that we were able to generate any kind of funds."

At 6 years of age he was selling the old *Saturday Evening Post* at 5 cents a copy. The Great Depression was

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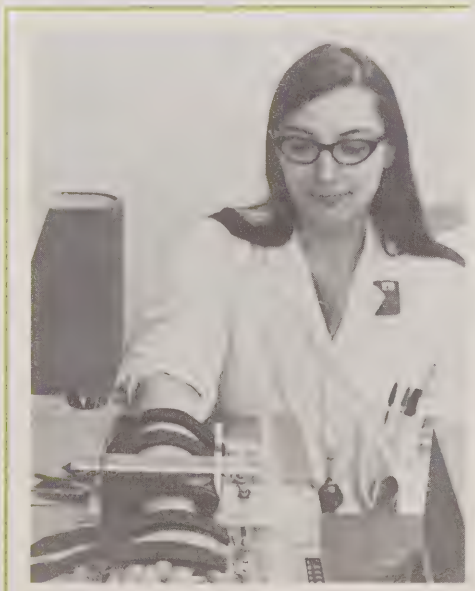

Determining mineral content of bone

A promising treatment for a bone disease that has defied medical science is being tested by an MGH investigator.

The condition is osteoporosis, the most common of all bone disorders. Five million Americans and many other millions throughout the world suffer from it.

The investigator cautions, however, that at least three years' work is needed before it will be known whether the drug treatment is effective.

In osteoporosis the amount of bone in a person's skeleton decreases progressively. As a result the patient becomes increasingly susceptible to fractures.

The disease leads to an estimated 350,000 broken bones annually in the United States where it is the most common cause of fractures in people more than 45 years old. For elderly people, some fractures – particularly those of the hip – often result in death.

"A clear and urgent need exists for a method of treatment of osteoporosis in order to prevent the massive numbers of fractures it causes," said Dr. William H. Harris, an MGH orthopedist. The MGH has just received a $124,525 grant from the John A. Hartford Foundation to study his proposed treatment over a two-year period. The award is announced jointly by Harry B. George, President of the Hartford Foundation, and Dr. Charles A. Sanders, General Director of the MGH.

As one purpose, the treatment aims at slowing the rate of bone loss enough to prevent people from developing disease symptoms. A more difficult goal is to add to the net amount of bone in a person's skeleton (skeletal mass) to

(Continued on Page 2)

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EDITORIAL:

Of Interim and Permanent Captains

Last January the hospital's search committee decided to name an acting general director. John E. Lawrence, Chairman of the Board of Trustees, explained that the move would give his committee time to search carefully for a permanent director. As acting head of the MGH, Dr. Benjamin Castleman would be an interim captain, a caretaker. In addition, he would continue his role as Chief of Pathology. But Dr. Castleman has served eight months, and like an interim Pope, the late John XXIII, he has directed the ship of state with firm hands on the helm and with courage to tack into a gale. When the occasion has demanded, he has scrutinized the ship's papers, questioning an arrangement here or challenging the placement of a mast there. Under his command, the ship's crew has never had a chance to grow complacent and the ensigns (the interns and residents) have profited through improved housing to replace their archaic living quarters. Dr. Castleman has also steered the ship through the stormy Strait of Governmental Regulations to begin construction for a new cancer center.

Now a permanent captain has placed his large hands on the helm. Dr. Charles A. Sanders has just become the 17th director since the hospital's first one in 1821. As a new leader, Dr. Sanders admits to no rigid, preconceived ideas on whither to steer the ship. He has just completed an inspection of institutions from California to the District of Columbia to examine various systems. As the months progress, what he observed on these visits, together with his personality and character, his education, and his prior experience, will help shape the course of his administration. To probe the depths of Charles Addison Sanders, the *MGH News* has interviewed him at length. In addition it has talked to a number of individuals who have helped shape his career or even his way of life: to people who have reared him, taught him, golfed with him, worked with him, or worked under him. The composite that emerges is one of an intelligent man with excellent leadership qualities; a compassionate, skilled physician; a lucid, soft-spoken teacher; a solid researcher; a loyal, dedicated employee; and a sound thinker with a knack for objective decision-making based on what is best in the long run for whatever unit he heads and institution he serves. He is a man who likes people and who in a non-political sense appears committed to enlarging the hospital's social role. Somewhere along the line the *News* expected to find the inevitable chink in his armor. If there is a major flaw, the *News* has failed to determine it. All of which goes to say that Dr. Sanders seems to bring into office the raw material to develop into an excellent hospital director.

Three-Pronged Trial Set on Bone Disease

(Continued from Page 1)

reduce or even eliminate symptoms in individuals already afflicted.

In animal experiments Dr. Harris has already achieved success. But the problem differs in humans.

The mode of attack on the disease is to stimulate production of normal new bone by administering growth hormone, the substance which makes animals including humans grow.

Dr. Harris gave such hormones to dogs. Like humans, canines progressively lose skeletal mass as they age. In fact the resulting condition is much like osteoporosis. In addition the mode of building up and tearing down of bone in the dog's skeleton goes on in a manner similar to that in a human.

By giving dogs growth hormone, Dr. Harris has managed to increase their skeletal mass. He found it heartening that the treatment was particularly effective at a portion of the bone called the endosteum. The tissue lining the cavity surrounding the bone marrow, the endosteum is the very region most weakened by osteoporosis. All the bone formed after administration of growth hormone proved normal.

"Not only will growth hormone increase skeletal mass in the young adult dog," Dr. Harris said, "it will stimulate bone formation in the aged dog as well. In the dog, osteoporosis can be reversed by growth hormone."

Also encouraging was that no harmful side effects resulted from the treatment.

With the John A. Hartford Foundation grant, the study is entering a new phase seeking the answers to three questions:

1. Will the skeleton of a human with osteoporosis respond like that of a dog?

BASIC STUDY LEADS TO NEW TEST

The research project on osteoporosis is another example of how basic research in fundamental concepts often leads to studies designed to improve treatment.

The present investigation is the direct application of earlier work on calcium and on basic research on growth hormone in experimental animals.

Box Score on Other Drugs

Raising the level of growth hormone is not the first means sought to treat osteoporosis.

Most of the other substances tried seem to achieve their major effect through decreasing the loss of bone. In dogs, at least, an increase in growth hormone adds to the net amount of bone on their skeleton. Such an increase is necessary to bring about a cure.

The only other agent which has a similar effect is fluoride, which leads to abnormal bone deposits.

By contrast, bone deposited by growth hormone is normal. In addition only small doses are required of L-DOPA, the drug being used in the MGH study to stimulate growth hormone. At the dosage employed side effects are infrequent.

Based on a recent study of patients with a disease called acromegaly (November 1969, *MGH News*), the prospects are favorable. Unlike the normal populace which suffers an increased loss of skeletal mass with age, persons with acromegaly escape bone loss. If increased levels of growth hormone can really prevent osteoporosis, it is understandable why the acromegalic patient avoids the disease; for acromegaly results from an overproduction of growth hormone. The question remains whether someone with osteoporosis can respond enough to be helped.

2. Will the side effects of increased levels of growth hormone be absent in man as they are in the dog?

3. What source of growth hormone can be used for man? Only primate growth hormone works in humans. With it in short supply some other tack is needed.

A drug called L-DOPA may prove the answer. In the last few years L-DOPA has come into prominence in the treatment of patients with Parkinson's disease. At the same time the medication helps relieve symptoms of many of these patients, it has coincidentally raised their levels of growth hormone. Dr. Harris wants to take advantage of this finding.

He is using the grant to set up studies of three groups of patients. One hundred Parkinson's disease patients who have been receiving L-DOPA for at least three years will comprise the first group. The project will compare the skeletal mass of these patients with the data from 100 men and women of similar age who do not have Parkinsonism and have not received L-DOPA. All women selected will be past the menopause because postmenopausal females are at the highest risk for osteoporosis.

A second investigation will start with 15 postmenopausal women who require L-DOPA for Parkinson's disease but who have not yet received it. By studying a patient before treatment begins, doctors can compare the skeletal mass at that stage with possible changes following treatment.

Thirty women at least 45 years of age who have an uncomplicated form of osteoporosis will comprise the third group to be investigated. Half of them will receive L-DOPA regularly. The other half will get a placebo, a sugar-coated pill that has no medicinal properties. Until the study ends, neither the physician nor the patient will know whether the latter has been getting the L-DOPA.

Tests made every six months will be compared with those conducted before the investigation.

"This three-pronged attack," Dr. Harris said of the entire research project, "will answer questions that any one phase by itself could not. . . . Thus we will be able to answer the question: Can osteoporosis be cured – if present – and prevented – if impending – by use of the elevated levels of growth hormone which L-DOPA produces?"

Project Takes Indirect Route

At present the attempt to find out whether growth hormone can be used in the treatment of osteoporosis is forced to take an indirect route.

Since human growth hormone is so scarce, the MGH investigation supported by the John A. Hartford Foundation has turned to L-DOPA which raises in patients their level of the hormone's production.

There is, however, some hope of using a synthetic human growth hormone in a few years. Several researchers, including Dr. Hugh D. Niall of the MGH, are attempting to synthesize it. The ability to manufacture the hormone is likely to end any problem of short supply.

New Kind of Nurse

(Continued from Page 7)

on a wealth of experience as a ward helper, nurse's aide, licensed practical nurse, registered nurse, and head nurse. She can also speak Spanish and Portuguese, as well as understand some Italian and Greek.

"Most nurses have a deep commitment to patients," said Miss Quinlan, "but for this kind of job they have to show it in a special way. Susan shows it. You can hear it. You can see it. Unless you can communicate – not just by words – it will not work. Unless the patient or family senses a really deep caring, the teaching will be ineffective."

A portion of research team: from left, Mrs. Edith Weinberg, Dr. William Harris' Chief Technician, operates bone mineral analyzer to determine mineral content of bone, as Dr. Richard Cobden, Research Fellow, checks arm position of Mrs. Maureen Appel, Research Technician, who models as patient. Mrs. Patricia Dunn, RN, Research Nurse, takes patient history.

"He Was Terribly Responsible for His Patients"

(Continued from Page 1)

breathing its last then, and he was not experiencing too much success.

After about six weeks he trudged home one day lugging a stack of unsold magazines.

"I quit," he announced. His father had other ideas, and the young boy continued to toil for about a year.

"He grew up," his mother said, "knowing that when he took on something, he had to carry through with it."

The same philosophy influenced his education. After school he generally had chores to perform, but he could not go to bed without completing his homework.

He both suffered and profited from having a brother seven years older who had blazed a high scholastic trail ahead of him.

"We went to all the same public schools in Dallas," Dr. Sanders said, "and I was always remembered as his brother. It didn't really bother me very much, but it did indicate that I needed a certain level of effort, and I think that was probably good for me."

Although work came first, an energetic youth could find much physical diversion in Texas. He obtained his driver's license at age 14, and his sense of responsibility helped him to avoid wrecking the family car.

Outside Dallas his father maintained a farm on which the youth loved to ride the horses. He also hunted for small game, a practice he would later abandon.

In high school he headed his ROTC unit and led his military summer camp. An outstanding golfer, the slim, six-foot, three-inch lad played on the high-school team.

His classmates elected him president of the student council. Debating intrigued him, and he traveled the state with the debating society. With both his father and brother lawyers, did he ever entertain a thought of abandoning his medical ambitions?

"I could never win an argument with them," Dr. Sanders recalls with an embarrassed smile. "It became very obvious to me that I would have to have a different profession."

His high-school grades impressed Yale University enough to offer him a scholarship. Dr. Sanders considered the offer but not for long. Both his brother and sister had attended the University of Texas, and well, the Longhorns produced the same kind of football powerhouses then that they still grind out.

Not very good reasons, he admits today, but adequate for a young Texan of intense loyalties.

To a teen-ager, the prospect of a dozen years' education for medicine weighed like a sack of uranium. Over the next two years, he riveted his eyes to the textbooks, completing three years in two. In the process he lost some of the liberal arts courses he feels would have rounded out his education.

Texas regulations then permitted him to enter medical school without his final year of pre-med provided that he later completed the requirements. At age 19 he entered Southwestern Medical School in Dallas.

Weary from the grind of the previous two years, he coasted over the next two. Professors made little attempt to relate the basic sciences to the care of patients, and young Sanders was rather bored. He still finds this lack of relevance a problem for students in the 1970s.

The final two years of medical school were something else. Contact with patients excited his compassionate instincts, and he plunged into his clinical studies. His grades soared.

Usually considered the best medical school in the region, Southwestern Medical School has two brilliant teachers who particularly stimulated him.

"When he took on something, he had to carry through with it."

One was Professor Donald Seldin who remembers student Sanders as an excellent scholar. Dr. Seldin later would repeatedly try to woo him back from the MGH.

"He was terribly responsible for his patients," Dr. Seldin said, "and very capable of applying high-level physiological principles to the specific care of disease."

Dr. Seldin has a knack for viewing a problem from all its facets, a quality which his pupil admired.

The other master teacher was a cardiologist named Dr. Carleton Chapman. Young Sanders could easily identify with his warm manner.

At that time (the mid 1950s), cardiology had not yet blossomed into its present golden era. But Dr. Chapman envisioned the sweeping innovations, and the student was fascinated by both the man and the vision. From that point he resolved to become a cardiologist.

It was Dr. Chapman who wrote Boston City Hospital physicians that they would be fortunate if they could land Dr. Sanders for their institution. They succeeded. Dr. Chapman later went on to become Dean of Dartmouth Medical School.

In what Dr. Sanders jokingly terms a rare moment of exuberance, his family bought him a new car to drive east. On June 26, 1955, a steaming hot Sunday, he wheeled up to Massachusetts Avenue and parked near City Hospital. The next morning on his way to the hospital he found the car was three feet shorter – another vehicle had crushed it.

He wanted to report the hit-and-run accident immediately to police, but at the hospital the new intern learned he had better make patient rounds first. One of the senior physicians, Dr. William Castle, notes that Dr. Sanders "kept his cool that day and that's sort of the way Charley's always been as far as I know."

Dr. Sanders considers that he came of age in Boston. Until his arrival here he had always lived on Texas soil close to the bosom of family and friends.

The streets of the South End in those days teemed with poor and alcoholics: "I had just never really seen anything quite like that," he said. Another surprise awaited him at the hospital.

He found his associates excellent

but had never been exposed in medical school to a situation so demanding of self-sufficiency. He had to do his own blood work, urinalyses, and stool specimens.

Along with the details, he assumed a lot of responsibility for patient care. For the first time he found himself making decisions affecting someone else's welfare.

"It took me about six months to get adjusted," he said. "I don't think I was a very good intern for about three or four months, and the last six months I think I did a good job."

What he believes helped mold him into a good intern was the tight structure of the Harvard medical service and the high quality of his fellow interns and residents.

Dr. Charles D. Davidson of City Hospital remembers Dr. Sanders' internship and residency clearly:

"He worked until his fingers were coming apart and right down to the bone and yet he had a warmth and ease not only with the rest of us and his senior colleagues, but also with his patients. He took superb care of his patients in the best tradition of City Hospital."

Devotion to patients, high intelligence, skill, and eagerness to cooperate were qualities that later caused Dr. Maxwell Finland to try to entice Dr. Sanders back from the MGH to head City Hospital departments.

It is an additional quality that is also remembered by Dr. Walter H. Abelmann, Chief of the Division of Cardiology at the hospital's Thorndike Memorial Laboratory:

"He stood out for his ability to assess complex medical problems in a most straightforward and penetrating way and his ability to express himself precisely and to the point."

In addition to the experience of beginning internship, 1955 stood out in a more personal way. At the University of Texas a black-haired girl who reigned as the campus beauty queen had impressed him several years earlier. He had thought she would be married when he returned home to take part in a friend's wedding. When he chanced to meet her again, Elizabeth Ann Chipman was still single. Eight months later they married, and Mrs. Sanders joined her husband in Boston.

In 1957 he rose to the chief residency and was charged with running an entire service. As in high-school

An outstanding golfer, he played on the high-school team.

ROTC, he took easily to leadership, learning readily to deal with the administration, the patient, and the house staff. He managed to defuse situations before they erupted into serious problems.

At that point he also plunged into two research projects.

"He was one of the first residents to tackle interdisciplinary [involving various specialties] research programs and see them through to eventual completion and publication," Dr. Abelmann said. "He demonstrated an ability to bring people from different fields together."

In Boston Dr. Sanders met Dr. Bryan Williams, another transplanted Dallas resident, who later became Dean of Southwestern Medical School. Then at the MGH, Dr. Williams suggested that he apply for a one-year fellowship in cardiology at the MGH. He did and was accepted.

At the end of the year Dr. Chapman, then still the Professor of Cardiology at Southwestern Medical School, tried to lure him back with a special fellowship from the National Institutes of Health. The MGH countered with an offer to eventually make him chief of the Catheterization Laboratory.

After a second year as a fellow, he did a tour of duty in the Air Force. He returned to the MGH in 1962 as Director of the laboratory.

The demand for the diagnostic procedure known as cardiac catheterization was comparatively small then. The laboratory performed only about four studies a week.

As open-heart surgery began to burgeon, so did the demand for patient studies. Today the laboratory performs about seven each day.

Dr. W. Gerald Austen, Chief of Surgery, is impressed with the fact that despite his demanding schedule Dr. Sanders was always on call:

"Anytime you telephoned him at home about a patient, he would come in whether it was midnight or 4 a.m.

"We take it for granted, but as I go around the country there are lots of very good diagnostic units that run 9 to 5. That has never been Charley's style. His style has always been, 'you take care of the patient first and that's what you are here for.' "

Patients report that this same dedication from Dr. Sanders follows them after they leave the hospital.

Running the catheterization program called for Dr. Sanders, a medical man, to work closely both with other medical specialists and with surgeons, a task sometimes demanding high-level diplomacy. How well did he accomplish this? Dr. Roman W. DeSanctis, the cardiologist who preceded him in the post, said:

"He has been very important in generating a closeness between the two services and an attitude which makes it possible for the medical and surgical people to work here in harmony and concert. There are very few institutions where the medical and surgical people work with more mutual respect than here."

Dr. Sanders himself attributes this respect to a compatible and brilliant young team of cardiologists and cardiac surgeons which joined the MGH about the same time he did.

Dr. DeSanctis in turn emphasizes key qualities in Dr. Sanders himself:

"He has the knack of taking a very complicated problem and just getting right to the heart of it in terms of what really is important. . . . In an administrative situation it's hard to please everybody.

"He is one of those unique people who can make decisions primarily on the basis of what's best for the hospital and what's best for the department. If you make decisions on this basis, people affected adversely will be disappointed, but they can accept them. He's very easy to talk to. He has a good sense of humor and a very quick, very incisive kind of mind.

(Continued on Page 6)

A Tower of Strength in Times of Tension

(Continued from Page 5)

"He's very easygoing, but when confronted with a problem, he can be very firm, very positive, and very tenacious and sees it right through to its conclusion."

A year after he had turned down a second tempting offer in Texas, MIRU (December 1971, *MGH News*) came along. The federal government gave the MGH $3½ million between 1967 and 1972 to do research on heart attacks. It was a gigantic program in search of a leader. Four people were under consideration.

The way Dr. Sanders tells the story, the four met to decide. One said he did not want the post; another did not have the time; and a third stated that he could not lead the unit. Dr. Sanders was the fourth.

"That's how I got to be MIRU director," he says with a chuckle.

For the first time he plunged into an effort that was purely research – and patient research at that.

"It was a very difficult problem to introduce clinical research into this hospital," Dr. Sanders stated, "because the MGH is so patient-care oriented. To do something with a patient unless it's absolutely necessary is just not in keeping with the spirit of the hospital.

"But we selected patients who were such poor risks – almost 100 percent chance of dying – and who had no other treatment available. Even so, the doctors were suspicious about the research, and we really had to sell ourselves as being responsible investigators who were dedicated to the welfare of the patient." Dr. Sanders has authored in professional journals more than 75 articles about his research.

More important, through dramatic new approaches innovated in MIRU, the unit has restored to good health patients who were doomed to die.

Treating patients close to death creates a lot of tension.

"Charley has been a real tower of strength in this sort of situation," Dr. DeSanctis said. "He has a way of keeping up the spirits of the people around him and keeping them going and excited and interested. He always managed to be there at the right time."

Nurses cite as tension breakers his ready smile, soft voice, and easy manner.

Running MIRU thrust Dr. Sanders into dealing with the government. He found some officials eager to tell him how to operate the unit. "I think that to sacrifice your independence is one of the most critical errors you could ever make," he cautions.

MIRU also provided him with a chance to observe research projects in other hospitals. He got to know some of the leading cardiologists in the country. In the process he also became known by them:

"Without question," Dr. Austen said, "he's recognized as one of the outstanding academic cardiologists in America."

In 1969 Dr. Sanders assumed an additional duty. He became director of the hospital's MEDLAB System, a computerized means of gathering and disseminating continuous information about critically ill patients. The government wished to find out if the system innovated by a Utah hospital was useful for other institutions. It was not.

In both MEDLAB (patient use) and MIRU (research use), Dr. Sanders has had to grapple with the computer.

"Computers have a tremendous capacity to do things," he said. "The real problem is asking them the right questions. Computers cost quite a lot of money so that you better have some pretty good questions.

"In the initial heyday, the government has been interested in seeing how this can be applied to medicine, and that is appropriate. Yet I don't think we've made them a real paying proposition in patient care."

He mentioned the MGH's automated Chemistry Laboratory (January 1970, *MGH News*) as one exception.

While directing three different units and caring for patients, Dr. Sanders has fulfilled additional major commitments. As an Associate Professor of Medicine at Harvard Medical School, he has lectured on the physical characteristics of the normal and diseased heart. Dr. A. Clifford Barger, Robert Henry Pfeiffer Professor of Physiology at the medical school, evaluated Dr. Sanders' performance:

"He does an excellent job of making the first-year medical school student appreciate the relationship of the basic science to clinical medicine.

"Here is an excellent clinician who is superbly able to show to the students how important it is that they know what the mechanisms are that are related to the clinical problems. He's a very soft-spoken, very lucid, and a very stimulating teacher."

Dr. Sanders has just completed a three-year term as a member of the editorial board of what many regard as the world's finest medical journal, the *New England Journal of Medicine*. Its editor, Dr. Franz J. Ingelfinger, assessed his three years this way:

"When we send out manuscripts for review, we ask for comments to the other board members and also comments to be transmitted to the author. Many people don't bother with the latter because that's just so much extra work. He did.

"Again, if I needed help or advice he would give me a telephone call in a day or two and give me his answer.

Examining patient

He was remarkably prompt and dependable. He was thorough, accurate, and fair and easily one of the best editorial board members since I've been editor."

At home many of the same qualities which serve him professionally characterize his role as husband and father of four children. In his wife's judgment he keeps his cool in emergencies and makes decisions in a level-headed manner.

"He looks at the bright side," Mrs. Sanders said. "He tries to get everyone to laugh and certainly does not take himself too seriously."

Although he plays tennis infrequently, he reportedly plays it well. His Wayland home features a clay tennis court.

"He does all the work rolling the court and everything," Mrs. Sanders said, "then everybody else uses it. But he enjoys the preparation. He enjoys hard outdoor work."

His interest in football has never waned, and he likes to analyze the plays of an occasionally telecast Dallas Cowboys' game.

Dr. Sanders also likes to relax on the golf course – when he can find time. He infrequently does, but nevertheless scores in the high 70s.

Dr. Stephen E. Goldfinger, an MGH staff member and sometime golf partner, stands in awe:

"I take out a driver and struggle and strain and hit the ball as hard as I can, and he pulls out a three wood with an easy swing, and he's 50 yards past me. I think if he ever wanted to, he could have been a professional golfer."

Sometimes a person reveals another side to his nature on the golf course. Said Dr. Goldfinger: "He can hit a ball close to 300 yards. If I had that kind of a game and I hit a bad shot, I would be throwing clubs – but he's smiling.

"He never gloats over his good shots either. He's just very quiet, congratulates all my decent shots. On or off the course, I've never seen him manifest any evidence of temper or being upset."

In recent months Dr. Sanders was growing restless. He had organized his three units to the point they seemed to be running themselves. Highly interesting work, but no longer challenging to a man of much energy.

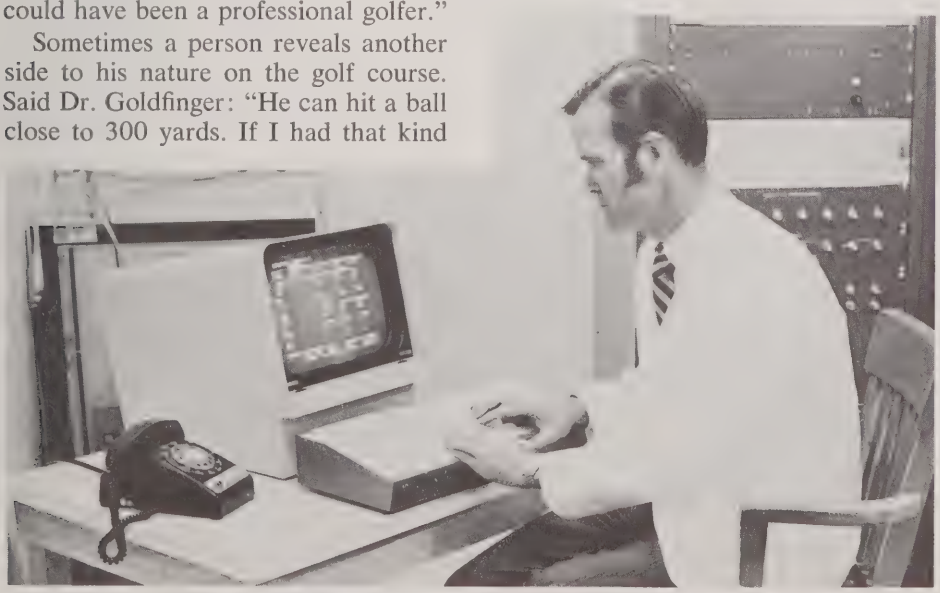
At that point the search committee headed by John E. Lawrence, Chairman of the Board of Trustees, was scouring the country for an energetic man with proven leadership ability to succeed Dr. John H. Knowles as General Director. Several MGH physicians suggested the 40-year-old Dr. Sanders.

"I didn't have any ideas about being General Director," Dr. Sanders said. "I would not want to be the director of another institution. But the General Director of this hospital is more than just an administrator.

"He interdigitates very closely with patient care, the research community, the clinicians, the medical school. There are an awful lot of facets of the operation here which are unique."

Dr. Sanders plans to use those facets to help chart a new course based on an expanded social role for the hospital. What concrete programs will develop in the coming months, even he is uncertain.

But he vowed not to let the hospital languish on past glories.



Checking computer printout of research data from heart study

A Job That Drains Body and Emotions

(Continued from Page 8)

reaction from the various unit nurses with whom she has come in contact while trying to follow up on a patient admitted through the Emergency or Overnight Wards. Sometimes she needs perseverance to overcome an initial resistance based on their unawareness of her role.

In the case of the patient with the irregular heartbeat, by the third follow-up visit, the unit nurse greeted her with a smile, telling her that the patient had been asking for her.

"The patients should have somebody they can talk to," said Miss O'Leary. "They should know what is going on. When they understand why certain procedures are being done to them, they cooperate, relax, and recuperate faster."

Based on her three years' previous experience as a head nurse on a surgical floor in the White Building, Miss O'Leary sees a particular need for instruction when a patient must go to surgery directly from the Emergency Ward.

An 82-year-old woman who had never been hospitalized except for childbirth was originally assigned from the Emergency Ward to a surgical floor for observation. A change in her condition made emergency surgery mandatory. Within half an hour Miss O'Leary had to reinforce what the doctor had told the patient about the operation, answer her questions, and explain the procedure after surgery.

"I had already done the preoperative teaching," she said, "when the son and daughter arrived at the hospital. When they came in, I discovered that they knew nothing about their mother's condition, so I had to instruct and calm them as well."

With part of her training and experience at a hospital for the chronically and terminally ill, she is well equipped to give support to the dying patient and his family. In the past few months she has dealt with ten such situations, all of them emotionally charged.

She acknowledges that that job is physically and emotionally draining, but her superiors state that she handles each new crisis with skill. She can draw

(Concluded on Page 3)

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Compassion + Information = Liaison Nurse

Think "Emergency Ward" and visions of life-and-death crises, organized chaos, traumatic injuries, and anxious and bewildered patients and families come to mind.

Think "MGH Emergency and Overnight Ward Liaison Nurse" and an RN with the ability and compassion to deal with those situations should come to mind.

The position of Emergency Ward-Overnight Ward Liaison Nurse is a relatively new concept in MGH nursing care. Miss Mary Quinlan, Assistant Director of Nursing in the hospital's White and Vincent buildings, originated the idea last fall.

Susan O'Leary, RN, began her new duties in the Emergency and Overnight Wards at the end of last November. One of the main functions of her job is to ease the apprehension and anxiety of patients and their families by explaining what is happening to them and what might occur in the course of treatment.

"Most often," Miss Quinlan said, "the house officer [a doctor-in-training] doesn't have the time in a crisis to explain to the patient in any more than immediate terms what is happening to him, although he would like to do more."

"The Emergency Ward nurses too," added Miss O'Leary, "have to think of the essential physical needs of the patient, and that is how it should be."

"I see the value of a nurse in this position," continued Miss Quinlan, "rather than a lay person. But only to the degree that she is freed from routine nursing activities can she do it."

Miss O'Leary estimates that she manages to talk in depth with 20 percent of the 200 patients entering the Emergency Ward daily and to see briefly about 10 percent. She tries to choose patients most needing her help.

Susan O'Leary, RN, explains the function of a cardiac monitor to Emergency Ward patient Angelina Capobianco.

Her schedule of interviews with patients and families often stretches beyond her eight-hour shift and five-day week.

To provide more continuity of care from the Emergency Ward entry and inpatient admission right through discharge, Miss O'Leary initiates a nursing history, nursing-care plan, and social profile on Emergency Ward surgical patients admitted to the White Building. Often she can spot potential areas of difficulty for the patient and contact the appropriate auxiliary services before a real problem arises.

"If, for instance," said Miss O'Leary, "there would be no one at home to take care of the patient when he is discharged, I can get in touch with Social Service right away so that they can be working on it."

She feels that a vital part of her role is her personal follow-up on these patients once they have been admitted to the units within the MGH where they will receive ongoing care. Patients, impressed by her subsequent visits, often ask to see her.

One such patient, a man in his seventies, while walking near a construction project sustained an injury that required suturing. During a routine EKG (electrocardiogram) performed in the Emergency Ward, it was discovered that his heartbeats were extremely irregular. He was admitted to the Coronary Care Unit, and a pacemaker was inserted to correct the irregularities.

"I explained as best I could what was happening to him," said Miss O'Leary. "I never presume to give the patient medical information I am not sure of. I also inform the nurses on the unit how he has reacted to his treatment."

She also keeps an anxious family informed about the treatment and gives what emotional support she can.

Miss O'Leary has received a mixed

(Continued on Page 7)

MGH News

Vol. 31 No. 8 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS October, 1972

English Rehabilitation Concept Brought to America

A Saving of Lives, a Crippling of Arms

Because the safety helmet is doing its job, an increasing number of motorcyclists are turning up with a serious arm injury.

Often disabling, the damage strikes a vital network of nerves in the arm. The MGH's new Surgical Upper Extremity Rehabilitation Service encountered four of these "brachial-plexus" injuries in one recent 10-day stretch.

Before the safety helmet a fall from a careening motorcycle often meant death from head injury. The brachial-plexus problem would then show up only at autopsy.

Now this condition is turning up among survivors.

"This is a major group of patients who require care," said Dr. Robert D. Leffert, new Chief of both the Rehabilitation Service and its Surgical Upper Extremity Rehabilitation Service.

"These are young people who very frequently work with their hands, and suddenly they are disabled. Often it's their dominant arm.

"There you have the hardest problem in terms of returning this patient to society in a gainful way. Since few individual practitioners have treated many brachial-plexus injuries, the details of care and steps in rehabilitation are still being improved in specialized centers such as ours."

Often the damage to the nerves cannot be surgically repaired. The first determinant is whether the lesion is irrevocable or will heal on its own. If not, physiotherapy to speed the process and improve the results would prove useless.

The surgeon can often help to recover function in patients with less complete damage. One recent victim of a motorcycle accident could neither move his shoulder nor flex his elbow. Nor could he extend his fingers or his wrist. But he could flex his fingers and also had retained sensation in the hand.

In the operating room the surgeon transferred some of the available flexor tendons to permit extension of the fingers.

Now he can extend his fingers and

(Continued on Page 5)

Jo-Ellen Forbes, RN, injects local anesthetic to continue the block of sympathetic nerves thus allowing Joseph T. McInnis to exercise arm without pain. Mr. McInnis has reflex sympathetic dystrophy, a condition in which either a shoulder or hand injury leads to a disablingly painful and swollen arm.

The MGH is bringing to the United States a concept in rehabilitation care pioneered in England.

Patients with complex upper extremity problems are now being treated in a major new effort by the hospital's Rehabilitation Service. *The unit on the ninth floor of the MGH's White Building will continue to provide comprehensive care for patients with spinal-cord injury as well as for those who have had stroke, amputation, and other causes of disability.*

Added to it, however, is the radically different field of hand, forearm, and arm problems. Dr. Robert D. Leffert, new Chief of the Rehabilitation Service, noted:

"The upper extremity probably accounts for a majority of home and industrial injuries. Whereas the surgical techniques that have evolved for these patients have made tremendous strides, the integrated approach employing all available means of treatment has lagged behind. The United Kingdom has pioneered in this area."

Since quietly opening July 1, the upper extremity specialty team has already cared for a wide variety of patients. One of the early ones was a 51-year-old cook who injured his wrist a year ago.

An operation then had only partially relieved the disabling symptoms caused by injury to his median nerve. His arm still pained him so much a year later that merely touching it made him wince. He had not been able to return to work.

When he arrived in the new upper extremity unit in July, he appeared extremely jumpy and withdrawn. He was smoking two packages of cigarettes and

(Continued on Page 3)

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EDITORIAL:

International Cooperation – a Necessity

An MGH surgical team has recently returned from a field trip to Greece (story on page 8). Its work in establishing open-heart surgery in an Athens hospital will provide a desperately needed service for the Greek people.

This is but the latest in a long history of such ventures by MGH personnel. Its physicians – sometimes singly, sometimes in teams – have traditionally circled the globe on medical missions to help the people of other countries; just as the hospital has maintained a tradition of helping the medically indigent at home.

But the latest expedition comes in what may prove to be a new era of medical cooperation. Until the last few months the exchange of medical knowledge has suffered in major areas of the world. In China, a bamboo curtain, and in Russia, an iron curtain, have impeded or even blocked the interchange.

Now there are signs that both curtains are being at least partially raised. Russia and the United States have agreed to make available to one another the fruits of each nation's cancer research. Indeed some early progress is already being reported. The recent thaw in relations with China has opened the way for an interchange between the medical men of the United States and those of that country. Acupuncture is one example of a Chinese technique that may prove of importance to American medicine.

The significance of these moves to improve medical communication between the three giant nations cannot be overemphasized. Medicine thrives when countries freely exchange information. No better example exists than the swiftness with which Europe adopted the idea of anesthesia for surgery after the MGH demonstrated the feasibility 126 years ago this month. Modern surgery itself began with that operation.

Whether the introduction of acupuncture will usher in another major advance is still unknown. The MGH is one of several American hospitals investigating that subject. What is clear is that international cooperation between doctors is a vital necessity. Idealistically the politics of nations and of individuals should evaporate when the health of humanity is in any way concerned. Helping sick people is all that should matter.

BOOKS:

Early Years of the McLean Hospital

Nina Fletcher Little

Foreword by Walter Muir Whitehill

(Boston; Nimrod Press, 1972; copyright The Francis A. Countway Library of Medicine)

Review by Dr. John A. Abbott

This richly illustrated book will delight anyone interested in nineteenth century psychiatry and in the MGH's slightly older (from point of view of patient care) sister institution. The Asylum for the Insane at Charlestown, as it was called at its inception; McLean Hospital in Belmont, as we know it now, admitted its first patient or "boarder" on October 6, 1818; while the MGH, chartered in 1811, was not completed to receive patients until September 1, 1821.

The book is concerned with the years from the inception of the asylum until its removal to Belmont in 1895.

Of the private estate which was to become the original site of McLean Hospital, a gentleman visiting Boston in September, 1792, wrote that he "took a view of the beautiful and commodius edifice which Mr. Joseph Barrell . . . is erecting for his country residence upon an eminence near the Charles River. As it will be the largest, too, I think, it will be infinitely the most elegant dwelling house ever yet built in New England. It commands the most beautiful views imaginable."

The "east front" of Mr. Barrell's residence faced southeast across the estuary of the Charles toward Beacon Hill where the cornerstone for the State House would be laid in 1795. Between them, on the far shore of the estuary, at the foot of the hill, the MGH would be built.

These three buildings – the asylum, occupying what had been Mr. Barrell's residence, the MGH housed in what we now call "The Bulfinch Building," and the State House – all three designed by Charles Bulfinch – stood at points roughly on a straight line.

From a private wharf at the bottom of the garden on Miller's River (a small tributary of the Charles) one could easily row across to Boston, and this water route greatly facilitated travel between the asylum and the hospital.

The book is constructed in main

around the diary of (George) William Folsom.

The 22-year-old diarist, who was the only assistant medical officer at the asylum, served as apothecary, and also had countless other professional duties – as attested by the rich variety of the entries in his diary. At the same time he was enrolled as a Harvard Medical School student. He recorded therapeutic procedures, operations he watched, and books he studied.

Moral management of their patients or "boarders" was the humane therapeutic order for the medical staff and other personnel of the asylum. The intimate and informal tenor of their ways is nicely exemplified by the entry, "Mrs. P. died at tea-time and I closed her eyes." The diary, by its many entries, documents the psychiatry of those days and the facts of moral management in an historically significant way.

In 1895 the buildings of the asylum were demolished, the work beginning the very day after the last patient was removed to the new McLean Hospital in Belmont. Encroaching industry and railroads had made the change necessary. In time the eminence itself on which the asylum had stood was leveled to make more space and to provide fill for the freight yards of North Station.

* * *

In preparation for writing this book review, I explored those freight yards and, through the Somerville Public Library, got in touch with the custodian of the Somerville Historical Society. In the yards, at a place some track-widths behind the power plant and great roundhouse, the city on the other side of those buildings, a yard foreman interrupted his checking of ties and rails to ask my business.

"Oh, the hospital on Crazy Hill – that was right there," he said, pointing away from the city and roundhouse a short distance to a waste place roughly level save for a damp hollow where some stunted willows grew; and "Miller's River used to be over there: it was completely filled in" – save that where its outlet used to be, there is some sort of a rectangular place where oil collects and is periodically redeemed. In the building of the Somerville Historical Society the beautiful and famous staircase of Mr. Joseph Barrell's mansion stands intact.

REHABILITATION CARE

"Fantastic Emotional Support"

(Continued from Page 1)

guzzling 16 cups of coffee a day. Both habits worsened his condition.

Called reflex sympathetic dystrophy, the ailment is one in which a person injures his shoulder or hand and then develops a disablingly painful arm.

The man was admitted and evaluated by a team. An anesthesiologist injected a local anesthetic to block the sympathetic nervous system in his arm.

A psychiatrist treated the patient for his addictivelike cigarette and coffee consumption. To determine his needs and assess what he could do with his hand, both physical and occupational therapists saw him.

Since the nurses spent the most time with him, they evaluated his overall picture. The recreational therapist found out that he liked to paint, and she made that possible.

And social workers investigated his home and employment situation to round out the picture.

"This man required fantastic emotional support from all of us," Dr. Leffert said. "He found a large number of people who were interested in getting him better and helping him do so."

As a result of the combined effort, the patient cut his smoking from two packages to six cigarettes a day. He also switched to a caffeineless coffee.

Continued a week, the sympathetic block enabled him to undergo intensive physiotherapy without pain. By using his muscles and joints for the first time in a year, he regained mobility in his hand. The hand that had been even too sensitive to touch could one and one-half weeks later grasp another person's hand. His nerves were calm; his attitude, positive.

At the end of 10 days he was discharged. His last words as he walked out the door were:

"Doc, I'm going out and get a job."

The type of problem he had is one of many dealt with in the new Surgical Upper Extremity Rehabilitation Service. To cope with such difficulties, Dr. Leffert has borrowed liberally from concepts he encountered while training under Sir Herbert Seddon in London.

"The British," Dr. Leffert said, "used their wartime experience to great advantage in the development of specialized centers in several fields, including upper extremity surgery. But the total-care concept in the United States has lagged behind.

"I wanted to bring their ideas here, and I found the MGH a dream in this regard because it has the resources, including highly skilled people in such a wide range of specialties."

When he came to the MGH July 1, he inherited "an excellent center for the

(Concluded on Page 4)

McLEAN ASYLUM IN 1844

"From a private wharf at the bottom of the garden on Miller's River . . . one could easily row across to Boston."

REHABILITATION CARE

Hands Reveal Much About People

(Continued from Page 3)

care of patients with spinal-cord injuries, residual stroke, or postamputation problems." He credited Dr. Donald S. Pierce, his predecessor, and Dr. Pierce's staff including Dr. Joseph S. Barr, Jr., and Dr. William L. Kermond for developing a unit which has achieved an international reputation.

Dr. Pierce (July-August 1968, *MGH News)* and the rest of the team are continuing to concentrate on those patients whose care requires skilled management for long periods of time. It may take as long as 250 days before someone with a spinal-cord injury can be discharged with the capability of dealing with activities of daily living.

For those with upper extremity problems, the stay is generally brief.

"Very often," Dr. Leffert said, "they can pick themselves up on their intact two feet and walk out of the hospital after the acute phase of their care is done. Then they come back to continue their care as an outpatient."

To help establish expertise in upper extremity disabilities, Dr. Henry J. Mankin, Orthopedist in Chief (April 1972, *MGH News*) brought Dr. Leffert and Dr. Richard Smith from New York's Hospital for Joint Diseases.

Dr. Smith was Chief of that institution's Hand Service. He is organizing an MGH Hand Service with Dr. John Remensnyder, Jr., of the Plastic Surgical Service. Dr. Leffert sees a great need for a concentration in this type of care:

"The first week [the week of July 3] in the hand clinic," Dr. Leffert said, "we had six patients. Last week [the week of Aug. 14] we had 42." Those requiring highly specialized rehabilitation care are admitted to the Surgical Upper Extremity Rehabilitation Service. Nurses especially skilled in delivering that type of care staff the unit.

Why do hands require such expertise?

"If you look at hands," Dr. Leffert replied, "I think they can probably tell more about an individual than just about any other part of the body. In that regard they're probably equal to the face.

"The hands of a laborer require a power grip and the ability to withstand the blows of everyday hard work. A housewife, teacher, and orthopedic surgeon each have different requirements. When a person's hand is injured or disabled, we have to tailor the treatment to his needs."

Mrs. Patricia Williams, hands and legs crippled by rheumatoid arthritis, exercises splinted fingers given mobility by operation using relatively new technique of replacing destroyed joints with silicone rubber. A shoulder operation (acromial resection), used at MGH for years and combined with the hand surgery, will make it possible for her to use this hand easily for the first time in three years. Inset in upper right shows hands of another rheumatoid arthritis patient. The hands appeared identical before surgical replant of knuckle joints with silicone rubber.

A patient with a paralysis affecting his hand may present opportunities to transfer muscles or do other procedures to provide stability. Before deciding which procedure is indicated, the surgeon must observe how the patient performs his everyday tasks with his hands. This may even involve motion pictures to see what the patient's particular requirements are.

In this vein, a previous MGH practice of performing such evaluations in specialized areas is being revived. A machinist injured in an industrial accident, for example, might be assessed in the hospital's machine shop.

As Dr. Leffert was being interviewed, a printer's apprentice who lost the tips of his thumb and index finger came in for rehabilitation. An occupational therapist gave him an activities-of-daily-living evaluation and then sent him to the hospital print shop for further assessment.

"You have to really get to know the individual to figure out whether you can help," Dr. Leffert said. "Or whether you should do anything.

"One of the most awful things is for a surgeon to perform a series of operations only to find that the patient doesn't use the ability given him. Then you've essentially had a triumph of technology over reason.

"So what goes into the assessment before embarking on a program is just as important as how well you tie surgical knots or sew up skin."

Making the assessment is a team which includes the surgeon, therapists (physical, occupational, and recreational), social workers, psychiatrists, and all other specialties that may be called in consultation.

At the opposite end of the spectrum from the assessment comes the sensitive decision to stop treatment. If continued improvement seems unlikely, the surgeon may favor such a step.

"If we commit a patient to an unrealistic program," Dr. Leffert stated, "this is more than costly; it's immoral.

"From an economic point of view the cost may be several thousand dollars. At age 20, though, what is a man's productive employment worth? In psychological terms you cannot measure the value."

(Additional photographs on Page 6)

A Saving of Lives, A Crippling of Arms

(Continued from Page 1)

his wrist. Since surgery, he returned for reeducation in getting his tendons moving.

At a later operation his shoulder will be stabilized so that the intact muscles that move the shoulder blade will now move his arm as well. The final procedure will reposition one of the chest muscles to allow the youth to flex his elbow.

"It is thereby possible," Dr. Leffert said, "for this severely disabled patient to have a very useful upper extremity with which he can work.

"The saving grace in this particular patient is that he has sensation in the hand. Without it, the whole series of procedures would not be worthwhile because he would not use an insensitive hand."

Unlike the motorcycle the bicycle does not usually cause serious brachial-plexus injuries because of the lesser velocity of the impact in a fall.

While the brachial-plexus problem usually strikes the young, another interest of the new Surgical Upper Extremity Rehabilitation Service is stroke, which more commonly attacks the older patient. The unit is hoping to collect useful information about arm paralysis in strokes. With such data may come improved treatment.

Similarly, comparatively new evidence has encouraged experts in arthritis to send rheumatoid arthritis patients to orthopedic surgeons. For people crippled by this disease, surgery can sometimes supplement medical treatment.

The new MGH Hand Service is performing a number of these procedures using the material, silicone rubber. The surgeons can straighten fingers, relieve pain, and preserve mobility.

"There's one problem, though," Dr. Leffert said. "If you have a stiff shoulder and painful elbow, you can't put even the most beautifully reconstructed hand in the world where you want to."

The new MGH service is beginning to explore the problem of the shoulder and elbow as well as the hand.

Many patients with rheumatoid arthritis also suffer leg disablement. Why then treat the hand and arm first?

"We have one 32-year-old woman with just such a problem," Dr. Leffert explained by way of illustration. "We elected to begin with her upper extremities. If she can use her arms, she could achieve a modicum of independence with a wheelchair.

"On the other hand if her hips and knee were operated upon first, she would need arm function for crutch walking. Without useful hands she could walk some place, but she couldn't do anything when she got there."

The Rehabilitation Service is planning to explore other areas that cause disability. Although diabetes is generally thought of as a cause of loss of limbs due to gangrene, it may also result in other conditions that orthopedists are interested in.

Among these is the "neuropathic joint" which causes joint disintegration and crippling. Protection with braces can stop the progression of the joint destruction.

Another area where braces can help is in neuromuscular disorders such as muscular dystrophy and other muscle diseases; multiple sclerosis and other nerve disorders. Orthopedists have learned they can help many of these patients with braces, splints, or even surgery.

"I would hope," Dr. Leffert said, "that in conjunction with the Neurology Service we will be able to investigate these patients to determine how much we can help.

Robert Cote, left, injured in a motorcycle accident, exercises fingers and wrist which he was unable to raise before tendons were surgically transferred in his left hand. Dr. Robert D. Leffert, center, supervises as James Sellers, Occupational Therapist, conducts exercise.

" . . . One of the things that makes it possible is the development of better braces. For example a patient with very little muscle due to muscular dystrophy could not wear conventional braces because they're too heavy for him to lug around.

"The production of plastic braces that weigh very little now makes it possible to brace such people, so that they can walk under certain circumstances. They thereby derive a new measure of independence.

"This particular situation illustrates very nicely how progress in rehabilitation is not the province of any one individual, but must really depend on the input from many diverse disciplines."

(Additional photographs on Page 6)

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Adjusting halo apparatus of Dr. Vincent Riccardi, who has cervical spine fracture. Team from left are Nancy August, Physical Therapist; Elizabeth Thomas, RN; Dr. Robert D. Leffert; Susan Holman, RN, hidden; and Roger Randall, Unit Coordinator. Spinal-cord injuries remain one of the major problems treated by the hospital's Rehabilitation Service.

(Articles on Page 1)

Nancy August, Physical Therapist, assists Mrs. Mary Spooner with gait training using an artificial leg.

Mrs. August helps Michael Jay Barrows, a paraplegic, learn to transfer from his wheelchair to bed.

Chester Morse Jones: The True Physician

"And Gladly Teach," the title of an address given by Dr. Chester Morse Jones at the University of California School of Medicine eleven years ago, summed up the philosophy of his entire professional life. "The price of teaching is not small," he said, "but the rewards are great, and these include in the end greater learning."

An internationally famed gastroenterologist, Dr. Jones died this past summer in New Hampshire. He had been actively involved in patient care, research, and teaching in his medical specialty at the MGH since 1921. He had served as president of three prestigious national medical organizations: the American Gastroenterological Association, the American Clinical and Climatological Association, and the American College of Physicians.

In 1960, at the presentation to Dr. Jones of the Julius Friedenwald Medal by the American Gastroenterological Society, Dr. Hugh Butt said of him that his most important contribution was the counsel, encouragement, inspiration, and financial support he had given the many young physicians from this country and abroad.

Dr. Chester Morse Jones

One of his former students, Dr. Daniel S. Ellis, a Physician at the MGH, recalls that the residents in training under Dr. Jones were well aware that he would tolerate no slipshod work, but at the same time he always demanded as much from himself as he did of them.

A handsome, distinguished-looking, and impeccably dressed man with wavy hair and clipped mustache, Dr. Jones carried out his multiple responsibilities in an efficient, no-nonsense manner. He had no patience for small talk or for those people he considered "shallow." "But," said Dr. Ellis, "his devotion to his patients was extraordinary."

No medical or personal problems of his patients were ever too small to escape his attention. His patients, as well as "his" residents, benefited from the personal interest shown them. "No one," said Dr. Ellis, "will ever truly know the extent of the generosity and compassion of this man. He helped hundreds of people in one way or another."

A firm believer in interdisciplinary action against gastrointestinal problems, he brought together the talents of surgeons, a psychiatrist, a specially assigned social-service worker, and a dietitian in the Gastrointestinal Clinic which he organized in 1923 and headed as Chief until 1945. In treating the "whole person," he utilized a wide gamut of medical experts, believing that both patients and physicians benefited.

If in his professional life in Boston and in his contributions to national and international medicine he was precise and businesslike, it was at his summer homes in Jaffrey, New Hampshire, and at Sebago Lake, Maine, that he could truly relax and devote time to his family and friends. A native of Portland, Maine, he took pleasure in the natural wildlife of northern New England and was especially knowledgeable about flowers.

Pumping New Life Into Greek Surgery

(Continued from Page 8)

ties that make open-heart surgery not only feasible but successful. Cardiac anesthesia, postoperative intensive care, monitoring, and the physiology of extracorporeal circulation were areas in which the most help was needed.

Language was not a barrier. Most of the Greek physicians spoke excellent English, and Greek was spoken by Dr. Lappas, the MGH anesthesiologist.

"We did encounter some difficulty in the translation of concepts," said Dr. Daggett, "because we were not dealing with a language barrier, but with experience with a given type of problem.

"But we all found the Greeks very hardworking, dedicated people – doctors, nurses, all the staff. They were extremely interested in learning, quick to learn, and technically their surgery was excellent."

Mary Helen Purcell, who worked with both anesthesia nurses and intensive-care nurses, agreed with Dr. Daggett's positive assessment. "They have not been given the responsibilities that American nurses have," she added. "It was amazing to stand back the last week and watch how much they truly understood of what we had taught them."

As proof of their improved capabilities, the Greeks successfully performed cardiac surgery on six patients in the two weeks after the MGH team left. In addition, Dr. Daggett believes that all types of surgery in the Aretaeion Hospital will benefit from the intensive-care facility established.

In order to continue to upgrade care at the Aretaeion Hospital, Dr. George Z. Kapellakis, an Assistant Resident in Surgery, came to the MGH September 1 to spend a year in training. An anesthesiology resident from Athens will arrive this month. "We expect this to be the beginning of an ongoing relationship with Aretaeion Hospital," Dr. Daggett said.

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Pumping Life Into Greek Heart Surgery

For a seven-member MGH surgical team who spent a month in Greece this summer, the Parthenon was only a sidelight. The real focus was the establishment of an open-heart operating unit at the Aretaeion Hospital in Athens.

The team, led by Dr. Willard M. Daggett, Jr., an MGH heart surgeon, traveled to Greece at the invitation of Professor Constantine Tountas, chief of surgery at the hospital and president of the University of Athens. Professor Tountas, a cardiac surgeon, had visited the MGH over a year ago during a tour of cardiac surgical centers in the United States.

In Athens, very little open-heart surgery has been done in any of the major hospitals. There are several factors involved.

"One reason," said Dr. Daggett, "is that the Greeks were fighting a civil war into the 1950s. They started way behind in terms of their foundation in cardiac surgery in comparison with western European countries and the United States. In addition, it is not a wealthy country."

Another major factor is the difficulty of obtaining the necessary blood for open-heart operations. "The Greeks, as a people, are not used to giving blood," said Dr. Daggett. "One time when we needed extra blood, they canvassed virtually the entire city and did obtain it, but at tremendous effort."

The fourth reason for the dearth of cardiac surgery in Greece is economic. "In Athens," said Dr. Daggett, "the third-party payer, whether it's a private insurance company or whether it's government (and both are involved), sets a fixed hospital fee which covers everything – doctors' fees, hospital costs, drugs, and nurses – and it really doesn't matter how long or how little a patient stays in the hospital.

"Therefore, if a patient's problem becomes quite complicated, the hospital loses a tremendous amount of money. The economics of the necessary postoperative intensive care and very sophisticated cardiac surgical technology can be very troublesome."

The backlog of patients needing cardiac surgery in Greece is "staggering." Dr. Daggett estimates that the incidence of heart disease – congenital, rheumatic, and atherosclerotic – is similar to that in this country. During his month-long stay, he saw over 250 patients with established heart ailments as outpatients, and at the time of his arrival in Athens there were 50 patients in the Aretaeion Hospital with advanced stages of heart disease.

The MGH team performed twelve heart operations during their visit. The significance of their surgery was not, however, its quantity, but the legacy of training, organization, and teaching they left behind with their Greek counterparts.

Other members of the MGH team were: Dr. Demetrios G. Lappas, a cardiac anesthesiologist and a native of Greece; Dr. Delos M. Cosgrove, senior resident in surgery; Miss Barbara Dennis, scrub nurse; Roy C. Teixeira, extracorporeal perfusion technician; Miss Mary Helen Purcell, cardiac anesthesia nurse; and Miss Linda A. Laurentano, operating-room nurse.

As many as three or four Greek specialists corresponding to each of the MGH staff were involved in learning the highly specialized techniques. In some cases the MGH team had to start from scratch to organize effectively the equipment and manpower.

The Greeks lacked the basics of organization and critical support capabili-

(Continued on Page 7)

Dr. Willard M. Daggett, Jr., a cardiac surgeon, and Dr. Demetrios G. Lappas, a cardiac anesthesiologist, discuss the results of their month-long trip to Greece. Looking on benevolently is Hygeia, Greek goddess of health.

MGH News

Vol. 31 No. 9 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS November, 1972

Captain Charles Martell Sailed Uncharted Seas

Do Sickly Children Make Better Aquanauts?

Scientists whose health was poor in childhood may make better aquanauts than those who had fewer medical problems.

An undersea study in which an MGH resident psychiatrist participated led to that conclusion. The same study raised the question of whether women make better aquanauts than men.

As an elective part of his MGH residency, Dr. William G. Prescott took part in the undersea experiment called Tektite 2. From nearly 1,000 feet away over closed-circuit television, he participated in observations on the behavior of 10 five-member teams of scientists who lived underwater for up to two weeks.

The team of behavioral scientists developed some ideas about why those who have experienced sickly childhoods fared so well on the project.

"First of all," Dr. Prescott said, "ill health in the early school years imposes physical restrictions that may have stimulated interest in scientific pursuits. Perhaps as a psychological compensation for this early restriction, later good health may be associated with the heightened interest in outdoor activities."

The observers dubbed this the "Teddy Roosevelt effect" recalling the former president. After a sickly childhood, Roosevelt plunged into an adventure-crammed adult life which became legendary.

The observers – all males – also had some thoughts about why the women aquanauts outperformed their male counterparts. All five women participating joined to form one of the 10 teams. They spent much more time working than any of the male groups.

"Screening procedures were more rigorous for the women," Dr. Prescott said, "because there was a large number of applicants for the few positions

(Continued on Page 2)

Captain Charles E. Martell at sea, before the onset of his disease

Surgeons at the MGH have performed the hospital's 500th operation for hyperparathyroidism. The last 499 patients here and countless others elsewhere owe much of the successful treatment for this glandular disease to a rugged master mariner, Captain Charles E. Martell. His was the first such operation at the MGH in May 1926.

The puzzle of hyperparathyroidism is not yet completely solved, and research is continuing today on the mystery of this hormonal disturbance. The pieces which fit together to form today's diagnosis and treatment began on both sides of the Atlantic before the turn of the century. In this country the investigation culminated in a research ward at the MGH, where Captain Martell and his doctors helped to chart new seas of knowledge for subsequent patients.

The medical world was unaware of the existence of the tiny pea-sized glands until Professor Owen, a London zoologist, in 1862 described two yellow bodies in the neck of a rhinoceros. Later a Swede, Ivar Sandström, described and named them "glandulae parathyreoideae." "Para" means "along side of," and thyroid referred to the large gland in the neck beside which they are usually located.

In 1891 Professor Friedrich von Recklinghausen of Strasbourg, Germany, described skeletal changes in a series of patients who had died of various bone diseases. One of these patients showed the skeletal diseased state later known to be characteristic of some hyperparathyroid patients. Thus osteitis fibrosa cystica, a crippling bone

(Continued on Page 4)

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Saga of a Captain Courageous

The MGH's 500th operation for hyperparathyroidism (page 1 article) marks an unusual milestone. Much of our knowledge about the effects of excessive production of parathyroid hormone comes from a number of well-known MGH investigators whose work spans nearly half a century. Through an interlocking of their efforts, both with one another and with scientists at other institutions, they have step by step stripped the tiny parathyroid glands of many of their disease-producing mysteries. Continuing efforts at the MGH and other institutions give promise of solving the remaining unknowns about the disease. This cooperative intervention into one of nature's errors is an example of how a teaching hospital benefits mankind.

At the same time the dramatic detection of hyperparathyroidism thrusts onto center stage the equally important contribution that lay people make to such discoveries. Medical science aims its achievements at sick humans. Animal studies can lead the researcher just so far. Since humans are unique, the treatment benefiting animals may not work for them. Thus at some point the investigator must turn to the person who is suffering from the disease. When everything else fails to help the disease-ravaged patient, a promising new treatment is his last recourse. Such was the case with Charles E. Martell, the first of 500 persons treated surgically at the MGH for hyperparathyroidism. Captain Martell, a merchant marine, was as brave a patient as an earlier Charles Martel was a warrior. When medicine was prepared to concede defeat, the Captain's insistence brought about the performance of the final operation. He even suggested correctly where in his body to search. The understanding gained from treating him has provided a legacy to the many who have come after him. It is a little sad that except for a small fund no memorial has ever been established in his honor. But the intrepid mariner whose most important uncharted voyages took place in a hospital operating room would be happy with his symbolic memorial – a better life for hundreds of others who once, like him, would have been doomed.

* * *

One of those involved in the study of hyperparathyroidism was Dr. Edward D. Churchill, former Chief of the General Surgical Services. He was one of two MGH professional giants to die in recent weeks. The other is Dr. Chester M. Jones *(MGH News,* October 1972), one of the greats of the hospital's medical service. Their deaths followed shortly the passing of Dr. Nathaniel W. Faxon *(MGH News,* September 1970), who served as General Director of the hospital from 1935 to 1949. The loss of these three men in such a short period provides a reminder of the many internationally renowned doctors who have served the hospital so well.

The Underwater Life: More Hostile Place Than Outer Space?

(Continued from Page 1)

available. In addition, the ladies knew part of the mission was to determine the capability of women to continue to do undersea research and for space flight as well. There was much more publicity about the females. They were really on the spot."

Aside from an age difference – five years younger for the women – the fair sex had backgrounds that matched the men even in years of scuba-diving experience.

Above water, the surface-support personnel seemed a little more attentive to the needs of the female aquanauts. Once they plunged below the surface, however, the women received no favors. Any special privileges would have jeopardized the basic mission: to learn whether men and women really can live on the ocean bottom.

For two weeks each team's home was a habitat in the sea off St. John in the Virgin Islands. This undersea dwelling was composed of two 12-foot diameter cylinders, each with two 8-foot high rooms, joined by a 6-foot tunnel.

"Just existing in the habitat is quite a rigorous physical task," Dr. Prescott said, "because of the high humidity and high temperature, and the high density of the air mixture that the aquanauts were breathing. It's a very difficult place to live."

Scott Carpenter, the only man who has been both an astronaut and an aquanaut, characterized the underseas environment as more hostile than outer space.

"The undersea environmental control," Dr. Prescott said, "is not as good as it is in space. The atmosphere is not as comfortable. It's humid and hot. The pressure of the gases that you're inhaling makes it a job just to breathe. In addition you have the problem of hostile marine life."

To breathe in the water, the aquanauts used scuba bottles and oxygen rebreathers. A complicated piece of equipment, the rebreather posed a constant threat while the diver was working outside the habitat.

He could swim back to the habitat in the event of oxygen failure. He could not surface, however, without almost

certainly inviting a potentially fatal attack of the bends.

One of the purposes of Tektite 2 was to determine whether the aquanauts could breathe normal air for long periods underwater. At high undersea pressures the 80 percent nitrogen content of normal air produces a stupor that clouds the mind.

For this reason deep-diving aquanauts have in the past used a helium-oxygen (heliox) mixture. An air mixture, however, costs much less and avoids several problems created by heliox. A normal air mixture of 80 percent nitrogen and 20 percent oxygen worked well in the 50- to 100-foot depths probed by Tektite 2.

One end of the habitat always remained open. Pressure of the gas inside it stayed just high enough to keep the surrounding sea from roaring in.

Once one of the divers stepping out of the quarters encountered a barracuda.

"It frightened the aquanaut," Dr. Prescott recalled with a chuckle, "but it also frightened the barracuda too. It swam the other way."

Another time a moray eel crawled into the habitat. Before the vicious fish could sink its viselike teeth into anyone, one of the aquanauts caught it with a lobster snare and sliced it in half with a knife.

Another danger was the fire coral. Not a true coral, it looks enough like the ubiquitous coral reef to fool a careless diver. The result is a severe sting.

Each team was free to devise its own routine. Yet all 10 groups established pretty much the same divisions of labor.

They decided on who would cook, when they would get up, how often they would swim out of the habitat on work missions, etc. Generally they awoke early, breakfasted, and made one dive early in the morning.

In the early afternoon they studied whatever samples they had collected that morning. They would then usually search for more specimens in the afternoon.

Biologists would tag lobsters and do fish counts. Geologists would scrape samples off the ocean bottom or bring back coral.

The divers averaged about eight hours each day working and eight sleeping. They spent about five hours of the day in leisure pursuits and divided the little remaining time among various activities.

Dr. William G. Prescott emerging from habitat

Prepackaged food dropped down from the surface in watertight containers had only to be heated in the habitat stove.

Each team had an engineer to keep the habitat operating. The other four members of each group were scientists – for the most part either marine biologists or marine geologists.

When the mission ended, the aquanauts were asked to rate their leaders. The more aloof the leader, the higher his teammates rated him.

"The aquanauts were constantly in danger," Dr. Prescott said. "The theory is that the more they got to know the human qualities of their leader, the less they felt as though he could really take care of them. It's as though the leaders had to project through their aloofness some sort of strength or infallibility that in reality they lacked."

Rated by performance, the team members who excelled tended to be firstborn. Earlier underwater experiments, called Sealab, demonstrated the opposite.

The Sealab project, however, involved greater depths (205 feet), and more stressful conditions.

"This fits with a notion about birth order in relationship to stress which had been known before the undersea experiments," Dr. Prescott said. "Firstborns are more likely to volunteer for hazardous sorts of things but less likely to perform well in extreme stress situations. On the other hand they are more likely to perform well than later borns in situations of moderate stress. Since Tektite was considered moderate stress and Sealab extreme stress, everything fits nicely."

In another aspect of the study, those who attended religious services less frequently outperformed the others in Tektite 2. High intelligence was also associated with more productivity.

For some unknown reason those from small towns worked more than those from large cities.

Sponsoring Tektite 2 was the U.S. Department of the Interior. However, a number of organizations, educational institutions, and government agencies took part in the 1970 study.

Dr. Prescott had heard about the project through the U.S. Public Health Service which was providing the medical support. At the time, the Public Health Service was sponsoring him in a psychiatric residency at the MGH.

A scuba diver himself, he had three roles in Tektite 2.

As a diving medical officer, he was one of the doctors responsible for decompressing the aquanauts before their emergence from the depths.

His second role was as an assistant to Robert Helmreich, Ph.D., of the University of Texas at Austin. A psychologist, Dr. Helmreich directed the research team studying the underwater behavior of the aquanauts.

A third role was to provide medical care while the aquanauts were submerged. The physicians accomplished this via closed-circuit television.

Dr. Prescott could watch the divers from the command post on the island, connected by a 975-foot cord to the habitat. Microphones in the habitat made it possible to hear the aquanauts as well.

If an emergency presented itself, Dr. Prescott would have dived to the dwelling to treat the patient.

The only three dives the doctor made to the habitat came in between missions. He spent about an hour there each time to familiarize himself with the setting.

Dr. Prescott completed his MGH residency this summer. He described his Tektite 2 experience at an MGH Psychiatric Grand Rounds. With his wife and five children, the 35-year-old psychiatrist is now living in San Juan, Puerto Rico.

After U.S. Public Health Service duty there, he hopes to enter private practice in Boston, and maintain an affiliation with the MGH.

Albert and Martell Undergo Parallel Operations

(Continued from Page 1)

disease, also became known as von Recklinghausen's disease.

A few years later Askanazy, a pathologist, reported on the presence of a parathyroid tumor in a patient who had died of osteitis fibrosa cystica, but neither he nor others realized any relationship of diseased glands to diseased bone. Then Professor Jacob Erdheim, a Viennese pathologist, noticed that rats from which the parathyroid glands were removed not only developed tetany (symptoms of which are painful muscle spasms, cramps, and convulsions) but also lacked sufficient amounts of calcium in new tooth layers. With the discovery that the small glands affected calcium metabolism, pieces of the hyperparathyroid puzzle began to fit together.

Because of confusion about which came first, the bone disease or the enlarged glands, Felix Mandl, a Viennese surgeon, first treated Albert ———, a patient suffering from osteitis fibrosa cystica, with a parathyroid animal extract. When that failed, he transplanted human glands into Albert. Another failure. Albert's bones were fast disappearing. Mandl tried the opposite therapy – removal of the parathyroid tumor – and Albert's life was saved. Another piece of the puzzle fell into place.

The date of Albert's fateful operation was July 30, 1925. Doctors on this side of the Atlantic were unaware of the European experience, and von Recklinghausen's disease, if it was known about at all, was considered extremely rare.

Mandl's first published account did not appear until one month after Martell's surgery at the MGH.

The Americans approached the puzzle differently.

In 1900 a German-born American scientist named Jacques Loeb, in the course of research on frog muscles, discovered that calcium, when added to water and salt, caused the previously twitching muscle to stop contracting. With the knowledge about Loeb's frogs and Erdheim's rats' teeth, Drs. W. J. MacCallum and Carl Voegtlin of Johns Hopkins Medical School concluded after experiments with the glands in dogs that tetany was caused by too little calcium in the blood secondary to hypoparathyroidism, or underproduction of the glands.

The next step was the extraction of a potent hormone from the parathyroids, an advance achieved independently in 1924 and 1925 in Canada by Drs. A. M. Hanson and J. B. Collip. The latter went on to establish that when excessive doses of the hormone are given to dogs the level of calcium in the blood elevates above a normal range.

The focus then shifted to the MGH where research by Dr. Joseph C. Aub in combating lead poisoning had progressed to patient trials.

He and his co-workers had traced the pathways of lead in the body and found that lead followed the metabolic pattern of calcium, being stored in a fairly harmless state along with calcium in the bones. Adding calcium to the blood caused the lead to be deposited in the bones. A low calcium diet caused the lead to withdraw from the bones and to be excreted by the patient.

Using the parathyroid hormone extracted by Collip, Aub cautiously began treating his lead-poisoned patients and determined that the active parathyroid hormone caused withdrawal of lead (as well as calcium) from their bones.

Thus the stage was set for Captain Charles Martell when he entered the MGH referred by Dr. Eugene DuBois of Bellevue Hospital in New York. Dr. DuBois saw Martell for the first time in January 1926, only six months after Martell's European counterpart, Albert, had successfully undergone an operation still unknown in this country.

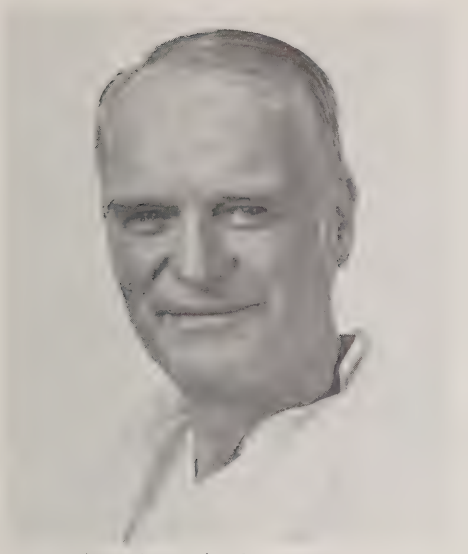
Martell was to endure much more, but as Drs. Walter Bauer and Daniel Federman wrote in *Metabolism,* "His attitude toward research provided unsurpassed models for study and respect. . . . A series of relevant developments gave [his] case its peculiar scientific significance. His own fortitude gave it its high moral value."

Captain Martell, born in Somerville,

Dr. Joseph C. Aub, whose pioneer work in lead poisoning set the stage for the Captain at the MGH

Dr. Walter Bauer, Dr. Aub's associate, later went on to study arthritis and rheumatic diseases.

Dr. Fuller Albright's investigations included not only unraveling the puzzling metabolic disturbances created by hyperparathyroidism, but also many other related endocrine problems.



Dr. Oliver Cope, the first surgeon to gain extensive experience in parathyroid surgery

Mass., was a strapping 6′1″ twenty-two-year-old merchant marine in 1918. At the time Dr. DuBois first saw him eight years later, Martell had shrunk seven inches and suffered eight fractures. Among other findings, X rays showed his bones to be markedly lacking in calcium.

DuBois knew about Drs. Aub's and Collip's work, but little, if anything, of the connection Austro-German doctors had made between von Recklinghausen's disease and the parathyroids. After conducting some metabolic tests on Martell, Dr. DuBois made a tentative diagnosis of hyperparathyroidism (overproduction of the parathyroids). He sent the patient to the research ward at the MGH for further studies under Drs. Aub and Bauer. This was the first time the disease had been diagnosed on this continent, and only the second time in the world.

No surgeon in the United States had ever operated on the parathyroids before; indeed, almost nothing was known about the number, types of tumor, or varying locations of the tiny glands. But the Captain's increasingly serious state and plea for help prompted extraordinary efforts.

He underwent two exploratory neck operations: two glands were removed, but no relief resulted. He was discharged from the MGH several months later on a high calcium diet, which enabled him to walk and return to work, this time as a marine insurance broker. By 1932 his condition had deteriorated, and he was operated on a third time in New York, again unsuccessfully.

At the MGH, Dr. Edward D. Churchill, then Chief of the West Surgical Service, was asked by Drs. Bauer, Fuller Albright (who had joined the research team in 1927), and Oliver Cope, a surgical resident, to undertake a study on the special problems involved in parathyroid surgery.

Dr. Cope wrote, "He [Dr. Churchill] discerned then, before the fact, that the success of parathyroid surgery must lie in the ability of the surgeon to know a parathyroid gland when he saw it, to know the distribution of the glands, where they hide, and also to be delicate enough in technic to be able to make use of this knowledge. He told me I must go to the postmortem room, dissect out the parathyroid glands, come to know what they looked like, and find out their distribution and anatomic relations."

After some 30 postmortem dissections of the neck, Dr. Cope began in 1932 the series of operations which is the second largest in the world, surpassed today in numbers only by the Mayo Clinic.

By 1932 Captain Martell, determined to be helped, had entered the MGH again. Three further neck explorations which revealed no tumor were carried out. The Captain never wavered.

In his case report, written by Drs. Bauer and Federman in the *Metabolism* article, they state:

"He was anxious to be helped, but a large part of his interest lay in what help his case could be to others. He persisted when the doctors were ready to stop, and he continued to serve as subject for study.

"The Captain, who was often found in his room poring over an anatomy text, was now convinced that the tumor was to be sought in the chest, and he urged a mediastinotomy [splitting the breastbone]. Finally, in November of 1932, after fourteen years of symptoms, after approximately 18 months of study in two metabolic wards, after stretching, racking, and framing, after countless other therapies, and following six previous operations, a sternum-splitting procedure was carried out by Dr. Edward D. Churchill. . . . [The tumor was found and removed.] The Captain stood the operation well; the bones began to improve. A month later he began to stand. Then one day one of the kidney stones [a complication of

Dr. Benjamin Castleman identified and helped to differentiate several types of parathyroid tumors.

the disease] became lodged in his ureter and required surgical intervention. This was followed by a series of complications, and death occurred six weeks after the removal of his tumor. . . . In this one patient, one was able to learn virtually everything known about hyperparathyroidism except the later discovery that it can be produced by hyperplasia [an increase in the number of cells causing enlargement] of all the glands."

Several more crucial advances were made at the MGH following Martell's magnificent contribution. The second patient of Dr. Cope (Martell was the third) had had severe kidney complications, as had the Captain at the time of his death. Dr. Albright began screening patients who came to the MGH with kidney stones but no bone disease. Within two weeks such a patient was found and operated on. A parathyroid tumor was discovered and removed.

A third complication of the disease was revealed in the 1940s at the Mayo Clinic by two men who had received training in the ailment at the MGH. They were Drs. Milton Rogers and Raymond Keating. They found that along with bone disease and kidney complications peptic ulcers could also be caused by an overfunctioning parathyroid.

A fourth complication, uncovered at the MGH by Drs. Cope, Perry J. Culver, Charles G. Mixter, and George L. Nardi, was acute pancreatitis. In addition, Dr. Stephen M. Krane conducted research along parallel lines on hypo-

(Concluded on Page 6)

Captain Charles Martell

(Continued from Page 5)

parathyroidism and calcium metabolism.

Much of the pathological work in identifying different types of glandular enlargement originated at the MGH. Dr. Tracy B. Mallory, then Chief of Pathology, and Dr. Benjamin Castleman, the present Chief, worked with Dr. Cope in the very first stages in 1931 when the glands themselves were a puzzle.

They participated in the original discovery of a new hyperplasia affecting all four glands. Cancer of the glands was also recognized by Dr. Castleman.

Dr. Sanford I. Roth, who joined the pathology team in 1957, has taken part in the finding of yet another hyperplasia involving all the glands. He has continued studies on the parathyroids to better understand the mechanisms of synthesis and secretion of the hormone.

From 1926 until the present, MGH doctors of medicine, pathology, and surgery have worked together as a team, and the feedback effect has expanded knowledge of the disease on all fronts. In medicine: Drs. Bauer, Krane, Albright, and John T. Potts, Jr.; in pathology: Drs. Mallory, Castleman, and Roth; in surgery: Drs. Cope and Chiu-an Wang.

Dr. Wang, Assistant Surgeon, has been performing parathyroid operations at the MGH since 1961. He is an acknowledged leader in this field, and in September carried out the 500th procedure. "This is very delicate, very specialized surgery," he said. "Most of the new advances in the last few years have been diagnostic rather than surgical."

Recent progress has come from the MGH Endocrine Unit, headed by Dr. Potts (*MGH News,* November 1968). He and his co-workers have artificially synthesized the active portion of the parathyroid hormone and have applied a technique called radioimmunoassay for detecting and measuring amounts of the hormone in the blood. The measurement of concentrations of the hormone is useful in sorting out those patients who have disease of the parathyroid glands from those who have high levels of blood calcium due to other causes, such as cancer.

In cases in which multiple glands may be involved or in which the tumor may be located in the chest (as was true with Captain Martell), higher concentrations of the hormone in veins near the tumor or tumors can be detected and measured. This is done by inserting a catheter or small tube into the veins to obtain blood samples. This technique provides surgeons with an added diagnostic tool for finding and removing the elusive tumor or tumors.

Thyrocalcitonin, another hormone which plays an incompletely understood role in calcium metabolism, is also under study in the Endocrine Unit. This hormone blocks the release of calcium from bone.

"It offers the first relatively direct hormonal counterbalance to the parathyroid glands," said Dr. Cope. "It suggests a feedback mechanism, and ultimately, how the parathyroids may be controlled. When there is knowledge of parathyroid control, some form of medical therapy will not be far behind."

Expanded Role for Adult Nurse-Practitioners

A program to expand the role of office and clinic nurses is under way at the MGH. The intensive seven-week course will train adult nurse-practitioners to work with family physicians and internists in the tri-state area (Massachusetts, Rhode Island, and New Hampshire) and in hospital clinics and neighborhood health centers to provide more comprehensive medical care.

Begun in 1970 by Dr. Michael Soper, a Harvard Medical School Fellow in the Department of Continuing Education, the course was set up in response to family physicians who felt their effectiveness to their communities was undercut by increasing demands for services. Most doctors expressed an interest in employing their own office nurses in an expanded role.

Even earlier, Dr. John D. Stoeckle, Chief of the Medical Clinic, and Miss Ruth M. Farrisey, Executive Officer for the MGH Clinics, had started expanding the role of clinic nurses in caring for adult patients. Pediatric nurse-practitioners were trained in the MGH Children's Division Ambulatory Service as early as 1964. An expanded program was later set up at the MGH Bunker Hill Health Center under Drs. John P. Connelly and Alfred Yankauer.

These efforts, now a nationwide trend, were among the early examples of the use of allied personnel to work with physicians.

"The emphasis in this course," said Dr. Ann S. Baker, physician-coordinator for the newest program, "is on the nurse as a primary caretaker and teacher, and the physician as an overseer and consultant."

For the past two years the course has been offered in collaboration with the Harvard Medical School Department of Continuing Education, the MGH Department of Nursing, and the Tri-State Regional Medical Program. Dr. Stephen E. Goldfinger, one of the MGH physician-teachers for the course, is Assistant Dean of the Harvard Medical School

Dr. James J. Dineen, MGH physician-teacher, and Dr. Ann S. Baker, right, coordinator for the program, teach Mrs. Thelma Tisdale, RN, the proper use of an otoscope in a physical examination as Miss Viviane Nathan models as patient.

Mrs. Aina Apse, RN, Nurse Coordinator, and Dr. Stephen E. Goldfinger, MGH physician-instructor for the course, supervise Mrs. Alison Rossiter, RN, in the use of the Problem-Oriented Medical Record.

Department of Continuing Education and Harvard Coordinator to the Tri-State Regional Medical Program. Mrs. Aina Apse, RN, of Staff Education serves as the course's nursing coordinator.

Fifteen nurses are enrolled in the current program, two from the MGH clinics and 13 from physicians' offices, community clinics, and the Visiting Nurse Service in Massachusetts and Rhode Island. Each nurse works with her physician during the course and for at least a year of practice to implement the new skills she has learned. In addition, a nurse preceptor oversees her progress when she goes back to the physician's office or clinic.

The nurses attend classes at the MGH five days a week, and they gain practical experience in history-taking and physical examinations at the Chelsea Soldiers' Home and the Massachusetts Rehabilitation Hospital. Eleven days during the course are spent in her own office setting, providing a learning experience for doctor and nurse alike as each adjusts to the changing office practices.

In order to prepare the nurse-practitioner for her new expanded role, three major areas are emphasized.

New patient evaluation includes the collection of information on each patient based on the Problem-Oriented Medical Record system (*MGH News*, February 1972). This includes a history (past, present, and family). She is also taught the necessary skills to conduct a physical examination, including laboratory measurements such as tonometry (measurement of pressure in the eye for detection of glaucoma).

"The problem-oriented approach was used to define and develop a curriculum for the course," said Dr. James J. Dineen, the physician who instructs the nurses on the Problem-Oriented Medical Record method. "This orientation clarified the nurses' educational needs and simplified the training necessary for her safely to assume significant responsibility for patient care."

The second area stressed is primary care of patients with chronic diseases such as hypertension, diabetes, chronic lung disease, arthritis, obesity, and congestive heart failure. Mrs. Apse, one of the MGH nurse preceptors for the course, said:

"We emphasize the normal, so that the nurse-practitioner can detect changes in the patient's condition. She is particularly concerned with health maintenance and prevention."

A data flow sheet to record pertinent information on the progress of the patient with chronic disease enables the nurse to monitor the patient's illness and to detect any changes. She can then consult with the physician and provide him with a comprehensive profile on the patient's disease should a change in therapy be indicated.

"Nurses are good teachers," said Mrs. Apse, "and they are good listeners. They can give the chronic-disease patient the necessary support and education for the management of his problem."

The nurses are also taught to recognize and manage common acute minor illnesses such as an upper respiratory infection, urinary tract infection, common gynecological problem, and minor trauma. They are provided with acute illness protocols developed to act as a guide in their evaluations of patients and for easy review by their physicians.

"From this information," said Dr. Baker, "the doctor can readily identify a problem or recognize the need for more data. The nurse can then see that the patient is provided with the instructions needed for his treatment. Each physician is required to work closely with the nurse in modifying the protocols and supervising her actions for a year's period."

Following the completion of previous MGH courses by the adult nurse-practitioners, many changes have occurred in the offices and clinics where they work. Additional part-time or full-time staff were hired to perform nonnursing duties formerly carried out by the nurse. Several offices were remodeled to provide the nurse with her own examining room.

In all the offices some form of the Problem-Oriented Medical Record is now utilized.

Physicians, graduates of the program, and patients are enthusiastic about the results of the course. Some doctors have reported that they can see 25 percent more patients with the help of their active nurse-practitioners. Some of the nurses are managing on a weekly basis 20 to 60 patients who formerly were seen by the physician, thereby giving him additional time for patients with complications, for teaching his office staff, and for his own continuing education.

The 33 graduates of the program have formed an alumnae group. Meetings are being scheduled four times a year for continuing education programs.

Said one graduate nurse-practitioner:

"There's so much good medicine in this country, but so many people aren't getting it. We feel we're doing something about it."

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"A Life of Intellectual and Surgical Activity"

Edward Delos Churchill might well have been called a Renaissance man of surgery. It has been said that his genius illuminated surgical teaching and practice at the MGH and throughout the world for over 40 years. Pioneer in thoracic surgery, wartime consultant, inspiring teacher, lecturer, writer, and forceful administrator, Churchill's contributions and honors were legion.

Retired in 1962 as Chief of the General Surgical Services at the MGH and John Homans Professor of Surgery at Harvard Medical School, Dr. Churchill died in September at his summer home in Strafford, Vt.

Early in his career (in 1929) he performed the first successful operation in the United States to relieve constrictive pericarditis, a disease in which the pericardium, or membrane surrounding the heart, tightens and interferes with the flow of blood into the heart. He was one of the first to demonstrate the feasibility of safely removing parts of the lung in patients with cancer of the lung and pulmonary tuberculosis.

In the early 1930s the mortality rates for chest surgery made such operations risky, but Dr. Churchill's high success rate was due to his understanding of the basic physiology of the lungs. His laboratory studies of the processes which control the flow of blood through the lungs and the relation of breathing to circulation paid off in the operating room.

Said one surgeon who served under him, "He was always on the lookout for occasions when research and biology could influence surgery favorably or vice versa."

The MGH House Pupils' Association presented him with the Treadwell Award in 1965 in recognition of his attempts to bring the laboratory closer to the operating theater. The award read in part: "Your thoughtful and imaginative application of physiological principles to the management of surgical problems revolutionized thoracic surgery and profoundly influenced the teaching of surgery in general."

He also developed new techniques in surgery of the esophagus and was instrumental in pointing out the delicate, precise technique necessary for parathyroid surgery (see page 1 article).

As Surgical Consultant to the North African and Mediterranean Theaters of World War II, his recognition of the need for whole blood in addition to plasma and his clarification of the management of wounds and wound healing helped to save countless battlefield casualties.

Dr. Churchill's deliberate style of speech was a hallmark, as was his ability to place the present in historical perspective. He was usually able to point out that a certain procedure was done long ago and then abandoned for specific reasons.

Dr. Edward Delos Churchill

One former pupil recalled: "I seldom heard him predict that a treatment would fail that it didn't. From Dr. Churchill one truly appreciated that surgery should be a continuity of experience, building on the lessons of the past."

A reserved, deliberate, and somewhat austere man, Dr. Churchill established a system of residency training which inspired fierce loyalty and dedication in the men who trained on the General Surgical Services. He wrote:

"The conversion of the old system of apprentice training under dominant staff proprietary control to an educational program which focused primarily on the care of the patient and the installation of a deep sense of responsibility in the residents themselves was the most significant contribution of the Surgical Staff during my period at the MGH."

Dr. Churchill fostered a sense of responsibility in the residents by his philosophical preference for speaking in generalities, allowing them to make decisions and draw their own conclusions. "He guided by direction and supervision rather than by specific intervention," said Dr. Ronald A. Malt, Chief Resident in Surgery when Dr. Churchill retired.

An honorary fellow of some 15 foreign medical societies, he was also a former president of the American Association for Thoracic Surgery and the American Surgical Association.

At the time of Dr. Churchill's retirement, Dr. Oliver Cope, his longtime surgical associate at the MGH, wrote, "His has been a life continuously full of intellectual and surgical activity. As the surgical work and patient care became less demanding, the time freed was more than filled with the labors of the mind.

"And of such is the genius of Churchill."

MGH News

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Exploding Knowledge Expands Respiratory Therapy

The Story Behind Those Darn Hospital Bills

The reasons for high hospital costs are little understood, but their effect is much deplored. While except for intensive-care units the MGH is not planning to raise its room rates this year, its rates have increased in previous years. At a recent Medical Staff Conference of the New England Hospital Assembly, Lawrence E. Martin, Associate Director and Comptroller of the MGH, outlined why care in hospitals is expensive. [*Editor's Note.*]

There are three principal reasons for rising medical costs – increases in: wage rates, costs of government programs, and sophistication of medicine.

It is generally agreed that wages of hospital employees were too low by any standard in the immediate post-World War II era. The employees no longer considered their jobs charitable in nature, and with the rapid growth in insurance coverage by the public, hospitals began to move their general wage levels to become competitive with the local job market.

At the MGH, for example, we have moved from a minimum wage of $1.05 per hour in 1959 to $2.50 per hour in 1972, an increase of 138 percent over a period of 13 years. This has a significant impact on hospital cost since approximately two-thirds of our costs represent labor, a far different ratio when compared to industry where labor generally varies from 15 to 30 percent. During that same 13-year period our fringe benefits for employees increased from $391,035 in 1959 to $6,294,202 in 1972, a rise of more than 1,500 percent.

Brought about by the government are additional increases in social security of $1,858,430, workmen's compensation of $85,947, pension payments of $2,047,956, and unemployment compensation of $63,403. (The pension-plan payments come under the heading of government because of the funding rules required by the Internal Revenue Service for becoming a qualified plan.) It is obvious to even the casual observer that these costs will continue to rise as Congress continues to increase the so-

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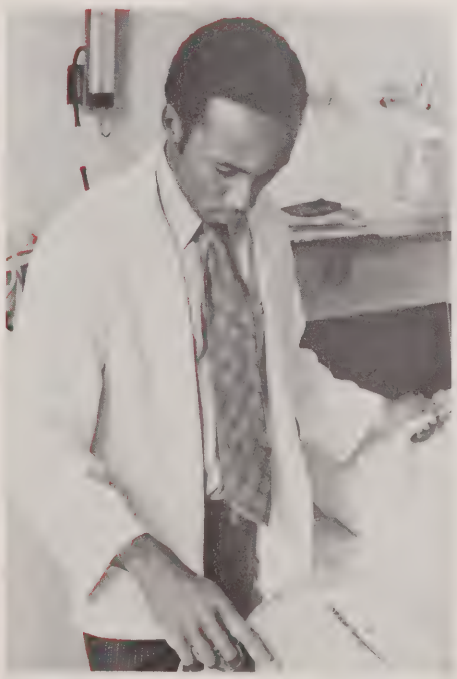

Napoleon Merlin, a Respiratory Therapy Technician, measures the volume of gas exhaled by a patient.

(First of two articles)

An explosion of knowledge has helped develop respiratory therapy into one of the fastest growing allied health fields in American medicine.

Nationally those providing respiratory therapy have quadrupled in number during the last five years. At the MGH which has pioneered in some aspects of pulmonary care, the Respiratory Therapy Department has more than tripled in just three years, going from 18 to 64 members.

From 25 to 30 percent of the hospital's inpatients daily require some form of this treatment. On a given day about 250 MGH patients need assistance with or treatment for their breathing process.

Jimmy A. Young, Technical Director of the Respiratory Therapy Department, explained how expertise and technology have given wings to the expansion:

"Medicine today has a better understanding of the pathophysiology [diseased function] of respiratory disease. Along with this new knowledge, equipment and techniques have become available to make a better diagnosis and treatment of the patient's disease process.

"The respiratory therapist has become efficient in using machines to provide diagnosis and treatment for patients with lung problems. Improved patient care has resulted and in turn increased the demand for personnel to maintain and operate these complicated devices."

Mr. Young also pointed out that the advantages of modern surgery are being extended to an increasing population including a larger percentage of elderly.

(Continued on Page 2)

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EDITORIAL:

Costs – Both Visible and Invisible

Ask 10 people for their biggest complaint about hospitals, and you may invite 10 tirades on medical costs. Hospital bills are too high. So are the prices of food, living accommodations, and a lot of other necessities. What makes hospital care itself so costly? Many factors. A number of these are discussed in a page 1 version of a speech delivered by Lawrence E. Martin, MGH Associate Director and Comptroller. His talk lucidly explains many of the underlying complexities of a hospital bill.

Other articles in this issue provide examples of two of the large number of specific areas that contribute to the high cost of hospitalization.

One describes the rapid growth of respiratory therapy at the MGH and around the nation. The other outlines some of the things this institution is doing to make the safety of the patient paramount. A page 5 illustration shows graphically what has happened to respiratory therapy. On the one hand it depicts an abrupt rise in the number of personnel. On the other it shows a tremendous climb in the number of patients benefiting from the treatment offered. Improving the health of as many sick people as possible is a large part of what hospitals are all about. Judged by this standard, the $1,329,000 budgeted annually for the hospital's Respiratory Therapy Department is well spent. And yet $1,329,000 *is* a lot of money. When you consider respiratory therapy is but one phase of hospital treatment . . . When you realize that many other departments have experienced rapid growth with similar benefit to the patient but with similar cost increases . . . then you begin to understand why more and better care often carries a higher price tag.

The effect on hospital costs of an area like safety is less obvious. Safety itself is usually invisible to the patient. Improved care may make him better, but improved safety means that he is well protected. He has a right to expect the institution caring for him will take every precaution on his behalf. Still some of the complicated devices which make possible greatly improved treatment do by necessity carry a slightly increased risk. Hospitals must take reasonable precautions against this.

What is needed are highly trained, highly paid individuals skilled in safety techniques. By definition highly paid people are expensive. That holds true whether in this area or in any number of other ones invisible to the public. And while these examples by themselves represent but an infinitesimal fraction of hospital costs, they do exemplify how subtle these costs can be.

Respiratory Therapy

(Continued from Page 1)

Older patients usually suffer from lung problems requiring respiratory care during their preoperative and postsurgical convalescence. How have patients benefited from the explosion of personnel and machinery?

"When nurses used to give this therapy," Mr. Young said, "their other duties often made it impossible to provide it for a patient more than once a day. Many of the less critically ill could not always receive the treatment daily if at all.

"Now we're giving needed therapy three or four times a day. While we have no statistics that would prove this, my impression is that many of these patients go home earlier than before.

"Earlier discharge and an improved charge system have probably kept charges from going up and may possibly have decreased them."

Dr. Henning Pontoppidan, Medical Director of the Respiratory Therapy Department, is pleased that "the freeing of nurses from most of the respiratory duties in intensive care has been a great help in the care of patients and has led to improved maintenance of equipment and improved knowledge of how the patient is ventilating [getting respiratory gases into and out of his blood], etc. As a result the nurse has been able to devote more time to other essential duties.

"The physician has benefited as well. In the past he had to be a bit of an innovator in terms of getting this aspect of treatment coordinated. Now he has available for the care of his patients around the clock well-trained, competent respiratory therapists and technicians who really know all aspects of such therapy. They can assist him in delivering sophisticated respiratory care in the management of critically ill patients."

The profession had its beginning as a separate allied-health field in 1947. It was then that a group of physicians formed what is now the American Association for Inhalation Therapy, later developing a training program for therapists. As knowledge and complexity increased, programs began to proliferate and lengthen. Junior colleges and four-year colleges took over from hospitals much of the training.

(Continued on Page 4)

The Story Behind Those Darn Hospital Bills

(Continued from Page 1)

cial security tax, and hospitals begin to feel the full impact of the unemployment compensation law which was applied to hospitals as of January 1, 1971.

Other government regulations indirectly increase hospital costs. A good example is the required reduction in sulfur content of fuel, which increased our utility expenses by $145,000 per year.

Finally, and most important, have come the rising costs brought about by the advances in medicine itself. This sophistication affects hospital costs in that new techniques usually mean additional personnel and/or equipment.

Significant Increase

The number of employees at the MGH increased from 2,958 full-time equivalents in 1959 to 5,001 full-time equivalents in 1972, an increase of 69 percent.

The employee ratio per bed has climbed from 2.1 employees per bed in 1959 to 3.5 employees per bed in 1972. The most significant increase occurred between 1968 and 1971 when 984 employees were added. A close examination of the reasons for this discloses that the hospital virtually plunged into intensive-care service during this period. Conjointly new operating rooms and new recovery rooms were opened to replace the antiquated and outmoded operating rooms of yesterday.

The hospital now has nine intensive-care units [I.C.U.'s] with a total complement of 93 beds.

In terms of manpower and ultimately cost, the surgical I.C.U. and the respiratory I.C.U. average approximately 30 hours of nursing per patient per day. This is seven to eight times the average in a regular nursing unit.

Special Tests

Another even more important cost factor is the tremendous increase of special tests or procedures. In the 1950s the average daily charge for room and board was three times that for special services (ancillaries). Today the average daily charge for ancillaries has almost equaled the average daily room and board fee.

We have seen inhalation therapy grow from a staff of four in 1959 to 64 in 1972 and the development of the blood gas laboratory from zero dollars in the mid-sixties to $450,000 in 1972.

We have watched the phenomenal growth of open-heart surgery and the resultant heavy demands on the operating rooms and personnel. We have witnessed the creation of brand new professions in the hospital field such as computer programmers, industrial engineers, surgical technicians, monitor technicians, systems analysts, and others, none of whom existed before 1959.

Expensive Equipment

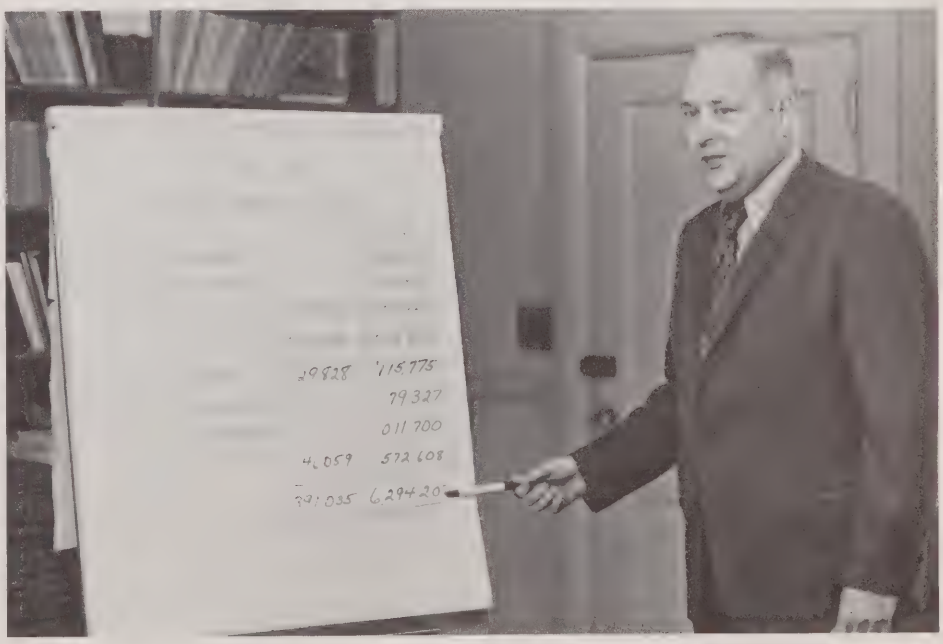
Finally increased sophistication has brought a new generation of expensive equipment to the bedside. Monitors, ventilators, respirators, etc., are not exclusively for the I.C.U.'s but have rapidly proliferated in all nursing units in the hospital. In addition even the more perfunctory equipment of the hospital has changed character. The mechanical hospital bed which cost $125 is now a motor-driven bed at $500. The mechanical typewriter at $135 is now motor-driven at $475. In total the MGH is spending more than $1 million per year on new equipment.

It is no surprise that the public and the third-party payer [such as Blue Cross, Medicare, and Medicaid] are concerned about these costs which have risen so dramatically in the last twenty years but primarily in the last five years. They are not aware of the reasons just discussed. All they know is that 'it costs too much!'

All of the presently contemplated controls by the third-party payer will not stop the increasing expense of medical care. The government now puts approximately $2 billion per year into research. The results of these studies are translated into increased sophistication of medical care at a price. Expenses will continue to increase until someone in authority is willing to make the decision on the cost effectiveness of saving a life at a price. Can further increases be justified economically in relation to the public's desire, and even willingness, to pay the price?

Consequently the rapidly rising medical costs have brought about a parallel growth in third-party coverage. In reverse the increase in third-party coverage has brought about rapidly rising medical costs. Both statements are true, but the public and its various representatives are now demanding a system of controls which will assure that the dollars are wisely spent in the most efficient manner. There is little doubt that these control mechanisms will affect the financial stability of hospitals, some of which are already in financial distress, while others are anticipating difficulty in the near future.

There are no immediate solutions to the multiple problems brought about by the third-party era. We must attempt to do a better job in letting people know that sophisticated medicine costs money. It will be their decision as to how far medicine will advance.



Lawrence E. Martin explaining one aspect of hospital costs

Respiratory Therapy – Better Care for the Patient

(Continued from Page 2)

At the MGH the department also started as a division of the Department of Anesthesia in 1947 with Edmund S. Banks as the first technician. During the 1955 polio epidemic physicians and technicians labored to exhaustion. Until then, American hospitals used the iron lung for treating polio victims unable to breathe on their own. Iron lungs, however, proved inadequate, and there were not enough to cope with the epidemic.

Recalling their experience in a 1952 outbreak in Scandinavia where positive pressure respirators which force air into the lungs were first used, some MGH anesthesiologists introduced the device to this hospital. This was probably a first in the country for the treatment of polio. After the epidemic subsided, the role of the department in providing direct patient care diminished.

After the modern era of more advanced respiratory therapy had dawned in the mid-1960s, Dr. Richard J. Kitz, Chief of Anesthesia, and Dr. Pontoppidan brought Mr. Young from Northeastern University where he was Technical Director of the Respiratory Therapy Program. Mr. Young, a leading authority in the field, has authored a much-in-demand textbook on the subject and has written numerous professional articles.

After he came to the MGH, one of the first concepts he examined was that of developing a team approach to respiratory care involving respiratory therapy and chest physical therapy personnel.

Like the positive pressure respirator the chest physical therapy form of treatment began in Europe. In 1960 European-trained doctors here decided to introduce this system to the MGH. Mrs. Marcia W. Rie was recruited from England to start a program.

To prove that the therapy was effective, the physicians began a controlled study. They ordered chest physical therapy for some orthopedic patients but not for others.

Mrs. Rie would loosen chest secretions by tapping (percussing) the chest and back, or by vibrating the chest. She would put the patient in positions that allow secretions to drain from the various lobes of the lungs. And she would teach how to take a deep breath, hold it, and cough effectively.

Some or all of these therapies helped patients recovering from major surgery, and those whose lung disease prevented them from breathing adequately or from clearing secretions from their airways. Many of these patients suffered from collapsed areas of the lungs; many had pneumonia; others were elderly people in high risk of developing it. Besides breathing control and secretion drainage they had four sessions a day to learn to cough without excruciating pain.

Very soon after the study began, it became clear that those treated by Mrs. Rie did better. With the issue quickly resolving itself, every doctor wanted his patients in her group, and her therapy soon became popular. The MGH Department of Anesthesia now employs 10 chest physical therapists under Miss Alice Couperus.

Two years ago the respiratory therapists and chest physical therapists formed a team approach.

"This is probably a first," Mr. Young said, "from the standpoint of two major specialties getting together to provide total respiratory care for patients. The physician is chief of a team that includes the nurse, the respiratory therapist, the chest physical therapist, and the social worker, to name but a few."

The respiratory and chest physical therapists usually work together in treating a patient. While the respiratory therapist is squeezing air into the patient's lungs with a hand-operated inflating bag, the chest physical therapist might be squeezing the patient's chest rhythmically. This well-coordinated procedure efficiently forces air into and out of the lungs.

With experience the therapist often develops an educated touch capable many times of feeling the secretions in the lungs. Knowing the location, she can choose the best way of freeing these secretions.

"Direct contact with the patient instead of the previous system of contact with machines is much more satisfying," said Eric Eldred, a Supervisor of Patient Services. "We get an instantaneous feedback as to what we are doing to help the patient."

Respiratory therapists never order the treatment but carry out the directions of physicians. To free as many people as possible for patient care, one respiratory therapist acts as a coordinator who does all the paper work and maintenance of equipment.

A therapist remains on call around the clock for each patient-care section of the hospital. One routine task is to maintain adequate humidity for patients on ventilators.

With a gauge the therapist also keeps

Napoleon Merlin, a Respiratory Therapy Technician, and Miss Mary Martin, a Chest Physical Therapist, team to provide therapy for a patient. As Miss Martin squeezes chest rhythmically, Mr. Merlin helps to maintain and support the airways while the ventilator is expanding lungs with a predetermined volume of gas.

a close check on the oxygen concentration delivered by the ventilator. If the oxygen level in the patient's blood is low, the doctor may order 100 percent oxygen. Or as the patient improves, the physician may require a gradual lowering of this percentage.

The therapist makes appropriate adjustments in oxygen concentration according to the doctor's orders. The ultimate aim is to reduce the oxygen to 21 percent, the same as in the air we breathe.

Eventually an attempt is made to free the patient of the support of the ventilator. During this time the respiratory therapist plays an active role in this process called weaning.

Respiratory therapists also play an important role in emergencies. If a patient stops breathing or his heart stops, the therapist is a vital link along with the nurse and physician in providing cardiopulmonary resuscitation.

"From the nurses we get knowledge that we wouldn't acquire if we were working only with machines," Mr. Eldred said. "We also teach the nurses about our role, and how the machinery operates."

Preventing That Locked-in-the-Job Feeling

How does an organization prevent its members from feeling locked into their jobs?

The American Association for Inhalation Therapy attacked the problem by providing a career ladder which an aspiring worker can climb. At the starting rung stands the Respiratory Therapy Technician Assistant. He cleans and stores equipment, transports it to the area of need, and performs simple maintenance duties.

On the next rung is the Respiratory Therapy Technician. He may attain the status through a formal program or through on-the-job training. His duties range from providing technical guidance in emergency resuscitation to the care of patients and safety aspects of this care. He administers gases and performs a number of other duties.

At the top of the ladder is perched the Registered Respiratory Therapist. A graduate of a program approved by the American Medical Association, he must pass stringent examinations given by the American Registry of Inhalation Therapists.

He provides intensive bedside respiratory care. If a patient shows signs of a breathing difficulty, the therapist must detect them and notify the attending physician. On a physician's orders, he carries out the patient respiratory treatment, coordinating his efforts with those of the nurse. It is his task to supervise and instruct the Respiratory Therapy Technicians.

Jimmy A. Young
Developing a Team Approach

A Monitoring Service That May Prove Unique

A central monitoring section that may be unique in America has become a feature of the Respiratory Therapy Department.

Eight department members under Dr. John M. R. Bruner's direction work full time with the monitors used to detect changes in blood pressure, heart rate, and the like. The team does everything from bringing monitors to patients needing them to keeping the devices in good condition and safe working order.

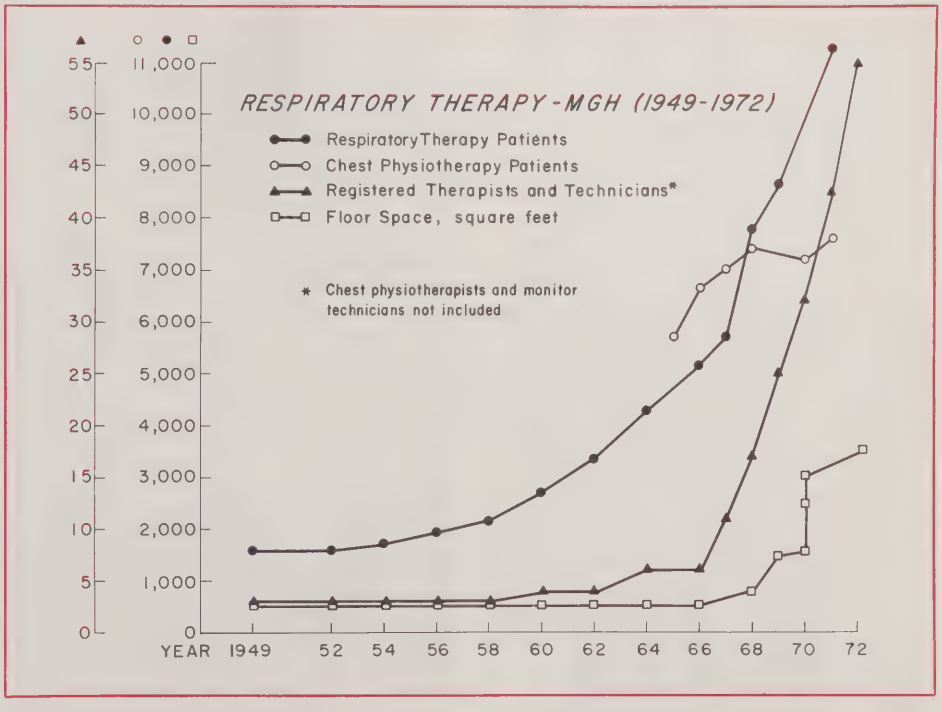
The monitoring section also instructs physicians and nurses in the proper use of the machinery. On a regular basis the section gives lectures to nursing groups and less frequently to doctors.

The members make the rounds of patients daily, cleaning and checking the monitors.

Miss Regina Craffey, RN, of nursing staff education, said of the system:

"The monitoring service delivers the equipment in good working order with safety checks made. Its members provide quick service with 24-hour-a-day backup for troubleshooting and evaluation.

"They are well versed in technical and clinical aspects, and they work very closely with the nurse."



Graph showing the rapid increase in use of respiratory therapy at the MGH since 1949; vertical column on left indicates number of registered therapists and technicians in a given year.

Safety: Quiet Eruption Behind the Scenes

Safety is a state of mind. At the MGH, awareness of safety extends into all areas – the research laboratories, the operating rooms, and personnel working conditions. But nowhere is it more vital than in patient care.

Automobiles, clothing, toys, drugs, food, and medical care – all have come under increased public scrutiny for safety. Hospitals across the nation, as well as regulatory agencies, are looking harder at what steps can be taken to improve the safety of the health consumer – the patient.

The federal Food and Drug Administration is moving toward regulations for the manufacturers of medical devices and instruments which will affect all hospitals.

The National Fire Prevention Association's Committee on Hospitals, a private group involved in the writing of standards and codes for hospital safety, has issued a complete set of recommendations. These cover not only safe use of anesthetics, high-frequency electrical equipment, and electricity but also contain safety recommendations for hospital administrators.

Currently, the various National Fire Prevention Association manuals are "informative in nature," and the standards they recommend are not enforceable. The association's Committee on Hospitals is presently voting on the advisability of converting its recommendations into requirements.

The MGH was the first hospital in New England to employ an individual whose full-time responsibilities include patient, visitor, staff, and building safety. For the last three years Mr. Robert V. Cavicchi has been Safety Officer.

He holds classes for all new nursing and building service personnel on the proper use of fire equipment and the coded fire alarm system. He conducts monthly fire drills on patient floors to insure that the proper preventive procedures are carried out and thoroughly inspects all buildings in the MGH complex for potential hazards.

The MGH Department of Nursing Inservice Education stresses safety procedures in its two-week orientation for new nursing personnel. In addition to Mr. Cavicchi's talk on fire safety, emphasis is placed on general patient safety, electrical hazards, security precautions, and staff safety. A new section on general safety has recently been included in the Nursing Procedures Manual, which is available in every patient-care unit in the hospital.

As a member of the Surveillance Committee, Mr. Cavicchi and representatives from the nursing, dietary, building service, and professional staffs conduct rounds of two different patient-care units each week.

"We personally inspect each room on the floor," said Mr. Cavicchi. "We can cut through the red tape and correct any potential problems immediately. Because I work out of the Maintenance and Engineering Department, I have a direct line to those who can quickly correct any problems in that area."

He has noticed a drop in the number of electrical problems reported, especially on repeat visits to units.

With the proliferation in recent years of intricate electrical equipment to aid in patient diagnosis and treatment, increased attention has been focused on the safety of such devices.

"You can make things safer, but you can't make them absolutely safe," said MGH physicist Dr. Saul Aronow, an expert on electrical safety. "While we must be continuously vigilant and keep improving our standards, the whole question of safety is also an economic one. Where is the best place to put your health-care dollar?" Expenditure of vast sums for little or no return in the way of added safety would prove a waste.

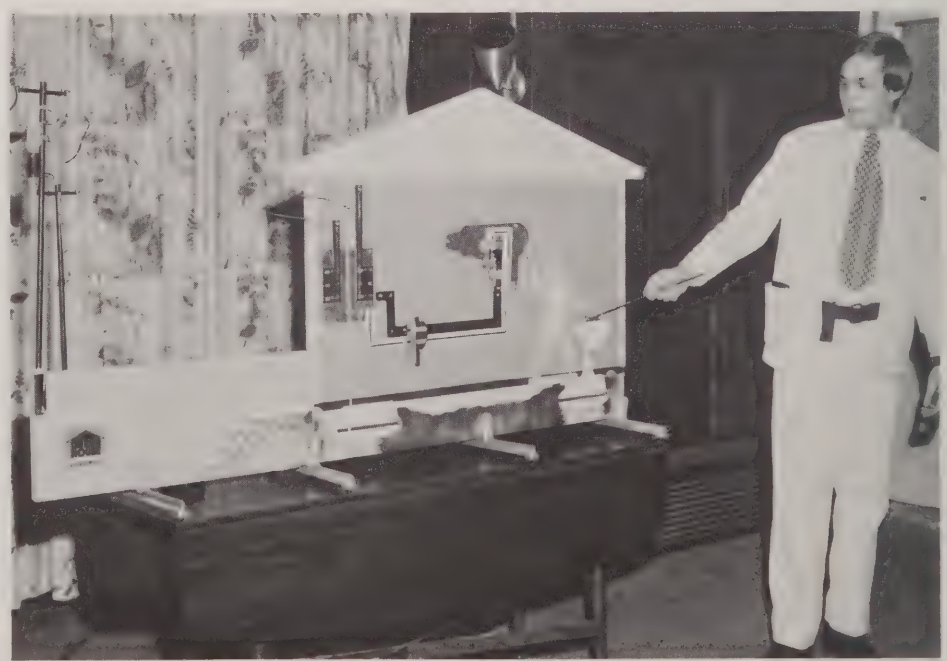
Dr. John M. R. Bruner, Assistant Anesthetist at the MGH, agrees. He, Dr. Aronow, and Mr. Cavicchi recently published a register of electrical incidents at the MGH in order to provide information in an area where little exists at present.

They reached two conclusions: 1. Excessively strict requirements for electrical devices and power systems which would significantly increase the costs of medical care were not justified by the available data; 2. Improvement of health care might benefit more from funds spent in other ways.

In the article they said, "Since the MGH tends to have more seriously ill patients than an average community hospital, has more than 10 percent of its beds dedicated to intensive care, and [has extensive equipment and instruments], one would expect it to have a greater than average exposure to the risk of electrical accidents."

The study disclosed a "remarkably small" total of 55 incidents, none fatal, over a 3½-year period in which there were about 95,000 inpatients. The most common injury was minor electrical shock.

"Maintenance and user education," they said, "are the appropriate, if unglamorous, approaches to solving the



Thomas (Tom) Bazluke demonstrates potential electrical hazards in "Danger House," a teaching model he uses in lectures on electrical safety for nursing personnel.

common and predictable problems."

Dr. Bruner is also Associate Director of the Respiratory Therapy Department and oversees its Monitoring Section.

"Part of using technical instruments in medicine," he said, "is making sure that the people who use them get useful information out of them. This means that you not only have to make the device work but also you have to educate people on how to use it properly and safely. We carry on a lot of safety supervision."

Mr. Thomas (Tom) Bazluke, chief technician in the Monitoring Section, presents formal lectures on electrical safety to nursing personnel. He and the other technicians also teach the nurses informally when they deliver a monitor to a patient's bedside.

The key to Dr. Bruner's thinking is that safety cannot be taught in a vacuum. "If you dedicate yourself to the idea of informed usage," he said, "utilization is more effective and automatically safer."

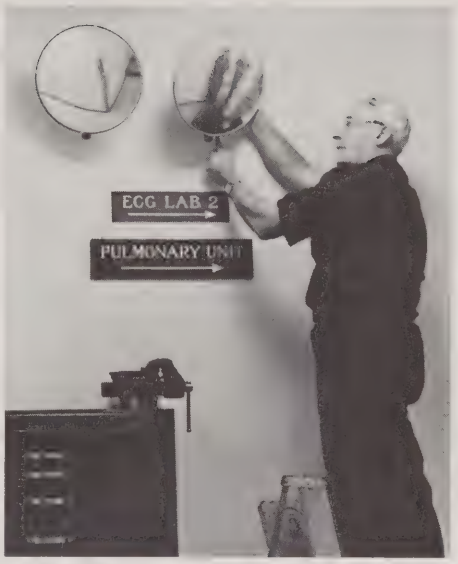
Before any electrical or mechanical device ever reaches patients, however, the Medical Engineering Department checks it for specific safety features. "We do an inspection for potential hazards of all incoming electrical equipment," said Dr. Jozef K. Cywinski, head of the Medical Engineering Department, "even including coffee pots."

In addition, the hospital purchasing department requires that manufacturers comply with the MGH's own safety standard as part of each purchase order for electromedical equipment. When they are put into service, all electrical devices are inspected at periodic intervals by the Medical Engineering Department (*MGH News,* November 1971).

Still another department intimately involved in safety is Maintenance and Engineering. Mr. Gilbert J. Nessolini, head of the 160-man department, said, "Everybody is safety conscious. We are continuously attempting to make safer conditions for patients, visitors, and employees."

A few years ago, he noted, the operating suites could be singled out as the major area of safety precautions. Today, however, more regulatory agencies at the state and federal levels have focused on the total hospital environment.

Foremen of all the building trades in



Mirrors mounted on the walls help people to "see around corners" to prevent collisions at busy hospital intersections. "Mr. Fix-it," Harold Webber, checks mountings to make sure they are secure.

Maintenance and Engineering conduct weekly inspections of all MGH buildings. The exclusive responsibility of one man, Mr. James Callahan, is to check and repair electrical outlets, especially in patient-care areas. Another, Mr. Harold Webber, known as "Mr. Fix-it," provides on-the-spot quick repairs during his rounds of the hospital floors.

Mr. Edward H. Tateosian, Environmental Control Officer, is responsible for cutting down the source of cross-infection through the hospital environment. He checks cleaning procedures to insure proper disinfection and tests equipment for bacterial analysis, all a part of hospital safety.

Two committees at the MGH coordinate efforts to make safety in the hospital a vital, ongoing force. One is the Research Subcommittee on Safety which directs and reviews the program for safety in the research laboratories in the hospital.

The other is the Safety Committee, whose members represent all levels of operations within the MGH. Mr. James Vaccarino, administrative assistant, is a member. He said, "The Safety Committee retrospectively reviews incidents which have occurred in the previous month and makes recommendations so that the problem does not recur. We are constantly trying to prevent problems before they happen by creating the safest possible hospital environment for patients, visitors, and staff."

Acupuncture Dialogue

(Continued from Page 8)

learning to control pain through willpower:

"I consider myself that the will of the patient has something to do with the mechanism, but I don't think it's the principal route."

Dr. Wu doubted whether willpower played any significant role in acupuncture's success. The fear of surgery harbored by most people, he commented, would make it difficult for them to exercise willpower.

"May we continue to work together in investigating this field," Dr. White urged.

86-Year-Old Footpower

The route of the Chinese doctors had been carefully planned. Federal security officers wanted to avoid risk of any incident.

At the MGH, as at other hospitals, the delegation would be guided along a secretly predetermined route: through a side entrance to an elevator in the historic Bulfinch Building and up to the fourth floor and the famed Ether Dome. The delegation reached the elevator according to schedule. But not knowing about the plans, Dr. Paul Dudley White took over at that point.

The 86-year-old advocate of footpower whisked the Chinese past the infernal machine and charged up four flights of stairs, the Chinese and their puffing American hosts behind.

Chinese Printout Jolts Chinese

Chinese doctors touring the hospital's unit studying heart attacks (Myocardial Infarction Research Unit) were jolted to see a computer printout written in Chinese.

The surprise had been prepared in honor of their visit by Yung Chun Hu, a member of the Harvard Computer Center which works with the research team. Mr. Hu was born in mainland China.

Dr. Edgar Haber, Chief of Cardiology, and Dr. Richard J. Kitz, Chief of Anesthesia, had arranged tours of their respective departments.

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Dr. White's Dialogue on Acupuncture

An experiment conducted by Dr. Paul Dudley White 55 years ago may bear some relevance to acupuncture.

That's what Dr. White conjectured to Chinese physicians during their MGH visit in October. The mainland Chinese doctors, here as part of a tour of several American cities, reacted with interest to the following anecdote told by Dr. White, a member of the MGH Senior Consulting Staff:

"In 1917 when I was a resident at the MGH, a young medical student came to me and said he could voluntarily accelerate his heartbeat. I had him come to my laboratory and attached him to an electrocardiogram [a machine that measures electrical impulses from the heart] and said 'go.'

"One second later his heart began to accelerate, and he reached a rate of 140 to 150 within a few seconds by willpower. His pupils dilated. His blood pressure went up.

"I wrote a paper about him. He had accelerated his heartbeat without any physical activity. It was accomplished purely mentally."

Dr. White then learned that in 1900 a student at Harvard Medical School had told his professor he could do this. But no one could recall the student's name or knew what had happened to him.

"To try to find out who it had been," Dr. White continued, "I put a note on the MGH bulletin board. One week later the Chief of Surgery here came to see me and said, 'I was the student.' I said, 'Will you come down to my laboratory and do the same tests I did on the other fellow?' "

The former medical student had not tried to accelerate his heart in 17 years but agreed to try. Despite the long interval he succeeded. Dr. White concluded that if two doctors at one hospital could do this, many other people could learn.

"This must have a little relationship to acupuncture," he said. "Can we learn voluntarily to control pain with or without acupuncture? It seems so queer I didn't realize the importance of this 50 years ago!"

* * *

Dr. White followed his anecdote, summarizing his 1917 report, with a question for the Chinese: "What are your thoughts about the mechanism of acupuncture?"

Dr. Wu Wei-jan, leader of the delegation and Vice Chairman of the Society of Surgery, Chinese Medical Association, observed that there is much unknown about the nervous system, "especially the autonomic nervous system" (the one controlling such automatic body functions as heartbeat).

Dr. White interjected that 200 years ago an Italian physician named Luigi Galvani discovered that animals have electricity. Commenting that this fact might also have some relevance to acupuncture, Dr. White complained that "we still have done very little about investigating this."

Dr. Chou Kuan-han, a Deputy Chief of the Department of Surgery of Peking Medical College and the acupuncture anesthetist among the Chinese delegation, replied that the Chinese as yet know little about how signals from the acupuncture needles get transmitted.

"We think that biological electrical current may play some role in the mechanism," he said. Dr. Chou then turned to Dr. White's question about

(Continued on Page 7)

Interpreter translates Dr. Paul Dudley White's comments to Chinese doctors assembled with MGH physicians in the hospital's Ether Dome.

MGH News

Vol. 32 No. 1 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS January – February, 1973

A Course "Doomed to Fail" Proves Quite Healthy

Doctors Plan to Test Acupuncture on Selves

Two MGH medical doctors and a doctor of philosophy plan to use themselves as subjects of an experiment on acupuncture.

Gene Smith, Ph.D., and Drs. Han Chiang, James G. Wepsic, and William D. Owens are setting up a program in which the investigators themselves will be the volunteers. In general, three of them would undergo experimentally induced pain.

Acupuncture would then be used by Dr. Chiang, an anesthesiologist, in an attempt to relieve the pain. The results would be compared with more traditional methods of pain relief. (See page 7 story.)

The experimental protocol calls for making use of pain studies pioneered at the MGH 25 years ago by Drs. Henry K. Beecher and Jane Denton, who developed some of the original procedures for quantifying pain levels for people who have just undergone surgery.

A psychologist, Dr. Smith has built on the original Beecher-Denton work. Dr. Wepsic is a neurosurgeon and Dr. Owens, an anesthesiologist. The group hopes to determine whether acupuncture really works.

In addition Dr. Chiang will journey to the Far East for advanced study of this kind of therapeutic treatment.

Dr. Richard J. Kitz, Chief of the Department of Anesthesia, cautioned that it will take many months at least before even preliminary results are available. He said that acupuncture will not be used in the treatment of patients unless it proves both safe and effective.

IS ACUPUNCTURE A FORM OF HYPNOSIS?

(Second of Two Parts)

Is acupuncture a form of hypnosis? In the last issue of the MGH News, *Dr. Paul Dudley White of the hospital's Senior Consulting Staff hinted that some unexplored capabilities of the human mind may play a role in acupuncture. Since then, Dr. William S. Kroger, Executive Director of the Institute for Comprehensive Medicine in Beverly Hills, Calif., went further in a*

(Continued on Page 2)

The needles of an acupuncturist at work

J. Napoleon Merlin was an MGH elevator operator. Now he is a respiratory therapy technician providing treatment to patients with severe breathing problems. What's more, he is team leader for his patient area.

Joan Murdock was a divorced mother of six and on welfare in 1971. But she has also become a respiratory therapy technician and a team leader.

Sarah (Sally) Smigielski was a mother of two children in 1971 when she became part of a program called WIN which helps people from low-income areas either to further their education or to undertake on-the-job training programs.

She had been out of school for a number of years and lacked any science education or training whatsoever. Now she is a respiratory therapy technician, has left low-income status, and with her husband has bought a six-room house in a pleasant neighborhood.

All three lived in low-income areas and had one other factor in common: a longing to better their lot.

The three of them were among the first 14 students in an experimental MGH program many thought doomed to fail. Yet, of the 14, 10 graduated from the one-year course to train respiratory technicians and are working at the MGH in that capacity.

As a result a second group of 14 is now being trained. All 10 people in the original group have risen from unemployment or unskilled jobs to their present status of caring for patients at the MGH.

"They're really motivated and quali-

(Continued on Page 4)

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EDITORIAL:

The Pros and Cons of Acupuncture

In recent months scores of people have queried the MGH about acupuncture. They ask many questions. Is the MGH using it? Is it safe? Does it work on arthritis? Headaches? Asthma? How does it work?

It is easier to ask questions about acupuncture than to provide scientific answers. First, does it work? Some world-renowned physicians such as the MGH's own Paul Dudley White have seen operations under acupuncture performed in China. They have been impressed with the results. Those westerners who have observed acupuncture as part of the surgical experience generally recommend that western medicine at least take a hard look at the procedure. Some advocate that this country adopt it outright. At the other extreme lie those physicians who look upon acupuncture as a tribal rite or a downright hoax.

Assuming acupuncture does work, one might ask how. One theory is that the needles used in the procedure stimulate nerve fibers. When stimulated, these in turn inhibit or block the small pain-carrying fibers which would ordinarily cause the pain in question. In a page 1 article acupuncture is "explained" by comparing it to hypnosis. The difficulty is that nobody really understands the neurophysiological basis of hypnosis either. Indeed it took many years before physicians accepted hypnosis as "real."

But does it really matter whether medical science knows why a treatment or technique works? In one sense it *is* very important. The knowledge of the basic mechanism leads to its intelligent application and the possibility of new treatments or preventive measures. In another sense the "how" is far less important than the fact something *does* work. Medical science is replete with treatments and procedures that proved successful long before anyone figured out why or how they worked. Nobody yet, for instance, knows precisely why aspirin lowers a fever or fights pain.

The question of safety can be answered in various ways. Obviously no procedure or implement is safe unless properly employed. In the hands of a murderer a scalpel can kill. In the hands of a skilled surgeon it can save lives. First of all, acupuncture, like any procedure, must be employed by a skilled practitioner. Secondly, it must be used carefully in conditions for which it can be effective.

The MGH which brought anesthesia to the attention of the world is now completing plans to investigate acupuncture. Only after these investigations are complete will the MGH decide what course to follow. If acupuncture proves to be a useful procedure, the concomitant decision will be to determine its precise applications. It may be that the answer will lie somewhere between the extravagant claims of its most ardent supporters and the complete negativism of its critics.

Acupuncture: A Form of Hypnosis?

(Continued from Page 1)

talk before the MGH Department of Anesthesia.

Stating that no one has offered a clear-cut explanation of acupuncture, he went on to present his own belief: that acupuncture as used in the operating room makes use of some of the techniques frequently employed in hypnotism and related phenomena.

Dr. White, who participated in the discussion with Dr. Kroger, offered some substantiating evidence based on his own eyewitness observations including a previously unreported procedure. Another panel member, Harvard Nobel Laureate Dr. George Wald, countered with his own opposing, China-based account.

What follows are excerpts from the seminar presided over by Dr. Richard J. Kitz, Chief of the Department of Anesthesia. [*Editor's Note.*]

Dr. Kroger: "I'm not against acupuncture analgesia [insensibility to pain]. I know it works. What I'm trying to do is offer some rational scientific explanation which thus far no one has satisfactorily been able to promulgate."

Dr. Kroger then went on to state his belief that acupuncture will have a greater success rate in China than in the western world. He based his prediction on conditions "which in a regimented society can bring about compliant behavior without the necessity of any overt cooperation on the part of the population. Such compliance I doubt is going to be obtained in western society unless we have strong sociopolitical reward inducement such as those offered by Mao's [Mao Tse-tung] new thought directives.

" . . . Another factor accounting for the success of acupuncture is the mock rehearsal which is utilized . . . before the operation. At the Friendship Hospital in China they take the patient through an entire mock rehearsal of the intended surgery. The same surgeon who is going to operate takes the patient to the operating room and goes through his procedure, and then he is brought down to the room where other patients have had acupuncture.

" . . . There is an emotional contagion which takes place as a result of group dynamics operating in a very subtle manner. This individual, if he has any hesitation whatsoever, has his

courage bolstered by individuals who have been operated on.

"This kind of preparation is very old to those of us who have been in the contemporary hypnosis movement. . . . It is called autogenic training [and has been used in numerous surgical procedures]."

Dr. Kroger then went on to discuss induction, which in hypnosis is the means by which the hypnotic state is brought about.

"In Equatorial Africa I have seen how the medicine man throws beetle juice to the four winds with incantations, and how he's been able to take off the entire top of the cranium with a hammer and chisel to let the evil spirits out. After a 7½-hour operation, the patient walks away . . . and shows no demonstrable signs of discomfort. The induction technique [in this case] is the gyrations, etc., which he [the medicine man] utilizes."

Dr. Kroger said that the induction technique for hypnotism is words. For acupuncture, he said, it is the laying on of needles. He stated that the use of charts and manikins also plays a role.

"Other variables," he said, "include the misdirection of attention. This is a very important factor in getting the individual's mind off what is being done. . . . Once you can make him unaware of what you're doing, then you can sneak a suggestion in. This is a technique of propaganda, advertising, etc.

"Other dependent variables are the good rapport. . . . I have to let my patient know there is no doubt it [hypnotism] is going to work. If I have the slightest hesitation in my voice or demeanor, that individual will pick it up.

"This is also what is happening in China. As I read the literature, Mao has laid down certain guidelines. In them he states the patient has not failed, you [the doctor] have failed to convince the patient."

Dr. Kroger said that for either hypnotism or acupuncture to work the patient must be strongly motivated.

" . . . If he has the appropriate mental set, the motivation, the misdirection of attention, the belief, and confidence all processed into conviction, we now get programmed faith. In that way the individual will respond, and he will respond . . . on the basis of past inputs that he's been programmed to expect.

"By a not-strange coincidence, the advantages, disadvantages, indications, and contraindications for each method of acupuncture analgesia and hypnosis are similar."

Dr. Kroger states that one report by a western observer of Chinese acupuncture indicates that some form of pain-killer or even anesthesia is often used in conjunction with acupuncture.

He added that the diseases described undergoing surgical treatment with acupuncture have also been surgically treated under hypnosis.

"I feel," he said, "that acupuncture analgesia can be explained within the context of the contemporary conditioning theory which involves . . . hypnosis. The only difference is the powerful preconditioning, and this powerful prior indoctrination adds an important dimension to this entire procedure. The charts, manikins, and the impressive models that they use can have a powerful and subtle influence on these individuals.

" . . . We can better understand the psychobiological responses brought about by both acupunctural analgesia and hypnoanesthesia – that they're one and the same. In both, conviction of pain relief leads to pain relief. What could be simpler?"

Dr. White made two points based on his observations of surgery under acupuncture performed during his trip last year to China:

"It was very obvious that the patients were part of the team. The surgeons had already gotten well acquainted with the patients.

" . . . The last patient I saw, a boy of 10, watched two women have dental extractions very vigorously [but painlessly] done [under acupuncture]. . . . The boy of 10 years did not have a needle, and I'm sure went through the extraction just as well. . . . There was a little pressure on his jaw, they'd said, but there was no needle."

Answering the point about advance preparation such as a mock rehearsal, Dr. Wald quoted a Chinese physician as saying:

"'Frequently we can't [prepare the patient in advance]. The patient comes in with acute appendicitis. The moment he arrives he's on the operating table. We've begun the needling, and there's no such preparation possible.'

" . . . I saw a major operation on a 3-year-old female mule. Much of what is being said about suggestion I would be hard pressed to practice on a 3-year-old female mule."

Dr. Wald stated that the mule was tied down but seemed to be in no pain.

Rebutting the argument about the occasional lack of advanced preparation, Dr. Kroger said:

"There's no problem to go up to a person who's a stranger and, providing he's receptive and he's motivated, relax him [through hypnosis] without any prior conditioning – even to the point of producing major surgical analgesia and anesthesia."

A psychiatrist in the audience pointed out that hypnosis for surgical procedures is suitable for only about 10 percent of patients. However, acupuncture is reported successful in some 70 percent of cases in China.

In his summary Dr. Kitz stressed that although hypnosis and acupuncture both can relieve pain there is no quantitative evidence to indicate they are related.

"Anecdotes and opinion are not sufficient," he said. "It is essential that acupuncture be subjected to the same rigorous evaluation that is required for any novel technique or drug before its proper place in therapy can be established."

Dr. Han Chiang prepares acupuncture needles. "Patient" is Dr. Gene Smith, an investigator who will be a subject of his own experiment.

Course Serves Large Doses of Upward Mobility

(Continued from Page 1)

fied individuals, and I wouldn't hesitate for a moment to be a patient and have any of them treat me," said Jimmy Young, Technical Director of the Respiratory Therapy Department, and incoming President of the American Association for Respiratory Therapy. "I would with some graduates of programs elsewhere."

The idea for the course dawned shortly after Mr. Young came to the MGH three years ago. At Northeastern University he had started the first two-year respiratory therapy course in Massachusetts.

With respiratory therapy expanding so rapidly, he realized many new technicians and therapists would soon become a necessity. Rather than rely on other institutions he chose to train his own students. His goal was to produce in one year top-flight technicians who were so well qualified that they could function at the patient-care level rather than that of working mainly on machinery.

With the encouragement of the hospital's administration he developed such a course. The National Alliance of Business in the U.S. Department of Labor contributed $38,000 for the first year.

"I was interested in upward mobility for individuals within the hospital as well as without," Mr. Young said. "Individuals unemployed or locked into dead-end jobs but with the motivation and capability to go on to a more challenging type position. In respiratory therapy the sky's the limit."

Mr. Young's unit recruited four highly motivated persons from departments including Building Service and Housekeeping. From ABCD they recruited four persons from among 25 applicants.

During their training period they would receive $108 a week. Those who graduated would get MGH jobs starting at $125 a week. Several other applicants so longed for the chance that the class took on six additional students. Since funds were lacking, they would receive no compensation from the program – not even for baby-sitters.

Mrs. Smigielski and Mrs. Murdock were members of this additional group. Mrs. Smigielski arrived the last day of interviews. Her interest in the MGH arose when her mother lay ill in the MGH.

"The staff was so fabulous to her during that time," Mrs. Smigielski told Mr. Young, "that I decided I would like to come to the Mass. General for any type of program."

Impressed by her motivation, Mr. Young accepted her.

Besides being poor, most of the students lacked a background in science education, and only one had any real experience in medicine. Three had not completed high school, but two of the three had passed high-school equivalency examinations.

One or two had some college education, but the average background was graduation from a high school. As a group they had not acquired good study habits. Many lacked basic math and basic English. In addition some had serious family problems that diminished their attention span even during class and provided a poor home environment for study.

The course content was not designed for short attention spans or limited backgrounds. Among the subjects were physiology, anatomy, and various phases of medicine and surgery. The students were to learn the causes and symptoms of various diseases so that they would understand the "why" behind the "what" which they were doing.

Miss Lillian Patricia Davis, RN, who was educational coordinator, often had to teach learning techniques as well as course content. The course material sometimes indirectly aided some of the students to adjust to their personal lives.

To teach, the instructors used simple analogies, demonstrations, and constant repetition. Nurses and doctors also taught various sections of the course.

From 8 until 11 a.m. the pupils struggled with the classroom material. The remaining five hours each weekday they observed on patient floors under the supervision of therapists who were treating patients.

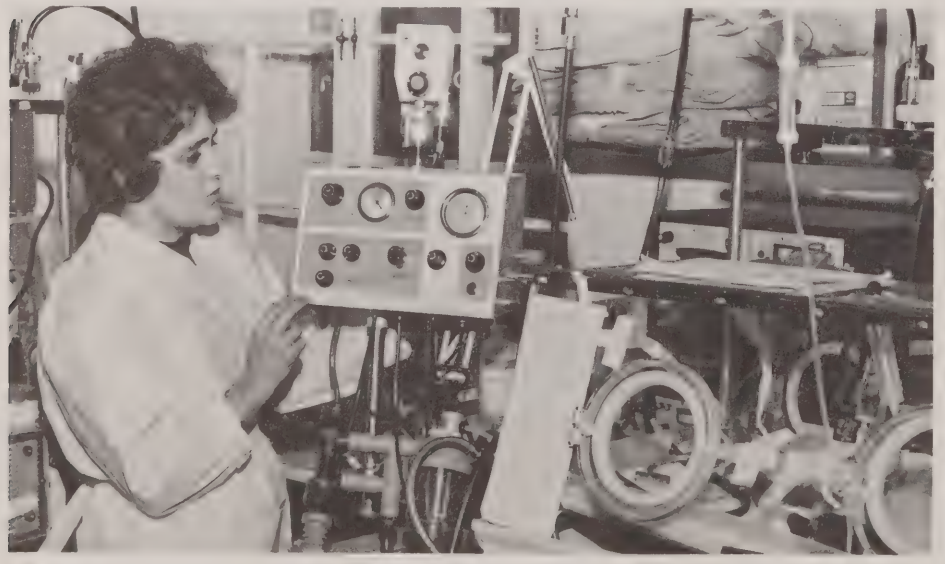
"What we did," Mr. Young said, "was to marry theory to clinical practice on a day-to-day basis. If we talked about anatomy and physiology in the classroom, we'd take them to the operating-room observation tower and say, 'There're the heart and lungs. That is what we talked about in class.' "

At the end of the fourth month the students went to the patient floors to provide therapy. Hovering over them was a therapist who scrutinized their every move.

Mrs. Smigielski recalls the first time she went to the Emergency Ward to connect a patient to a device called a ventilator.

"I was very confident. I knew what I was doing, and then when I stood back and realized that I had put a human being on a machine, I got scared. For the patient it worked out fine. For me my knees just shook."

Despite, or maybe because of, a poor educational background, the students



Sarah (Sally) Smigielski

came to learn. As their coordinator, Miss Davis had expected to teach them enough to turn them into good technicians.

She soon found out that they demanded to know a lot more. In certain areas especially, they pushed for much more knowledge than the basic course outline called for.

At first some department members had resented the specialized treatment accorded the trainees. But observing their obvious thirst for education prompted many of the staff to take advanced college courses themselves to keep from falling behind the newcomers.

Most of the members of the first class took advanced courses at Northeastern at the same time they were studying the basic material.

Mrs. Murdock was one of these. She would awaken at 6 a.m., ready her six children for school, attend the MGH program and Northeastern, return home at night, prepare supper, and put the children to bed.

"By then," she said, "I was sort of walleyed, but I would start studying anyway. Sometimes I'd be up until 2 or 3 in the morning and begin all over again at 6."

Mrs. Smigielski's children thought it was a "great big riot that mamma was going back to school" after so many years. But they kept quiet enough for her to study. Her lack of a medical background made the course especially difficult.

Gwendolyn (Gwen) Foxworth, a graduate of the respiratory therapy technician course

Mrs. Murdock and Mrs. Smigielski ranked near the top of the class in the practical side of treating patients.

Not all 14 of the original class fared so well. Of the four who dropped out two left because of a lack of babysitters. One was a woman with 13 children and a number of grandchildren. Severe problems with some of the children contributed to her leaving the program after about eight months.

Another one who failed to make the grade was a low-income resident with a recent criminal record. Month after month he struggled to cope with his studies. He got along well with his classmates but could not overlook the taunts of his friends at home who constantly ridiculed him for being "square." Even so he managed to stick with the classes off and on for some eight months.

The hospital's Personnel Department provided guidance and assistance for people like him who encountered home difficulties. But in the case of the four dropouts even this did not suffice.

For those 10 who persevered, a graduation observance took place last March. Immediately afterward they began their new MGH careers providing patient care.

"I've gotten an awful lot of respect as a technician from both doctors and nurses," Mrs. Murdock said. "More so because they depend on me.

"I've had quite a few discussions with doctors. They ask me what I think should be done. Having them ask my advice, I feel I have achieved quite a bit."

Mrs. Smigielski expressed her own satisfaction in different terms:

"It's a fabulous field. Sure it's heartbreaking to see those patients who eventually die, especially when you're involved with them every single day. But it's a grand feeling to see people come in so sick and later to watch most of them walk out well."

Susan Murray, another graduate of the respiratory therapy technician course

Antique Bottles Reflect Pediatric Practice

Bottle or breast? This controversy in infant feeding has raged for 40 years. As infant feeding practices have changed from generation to generation, so have the reasons pediatricians have advocated one method over another.

Until the latter part of the nineteenth century physicians had always recommended breast feeding for newborns by either the natural mother or a substitute wet nurse. It was the rare hearty infant who could survive unpasteurized, unrefrigerated cows' or goats' milk. Sterilization of feeding utensils and bottles was unknown until Pasteur's demonstration in 1864 that bacteria were responsible for food and milk spoilage.

Feeding bottles as we know them today – mass-produced, streamlined, made of plastic or glass – lack the whimsy and beauty of antique feeding bottles. An excellent collection of such bottles and other infant objects is on display on a pediatric floor of the MGH. They are part of a larger collection donated to the hospital by Dr. Robert N. Ganz, a member of the Senior Consulting Staff.

He has been in pediatric practice since 1927 and remembers what most doctors told new mothers then. "We advised them to give their babies cereal and vegetables after the first two or three weeks," he said, "but due to research we now know it is better to wait until after two months."

Breast feeding was still advocated during the 1920s because of inadequate standards of cleanliness in milk production. As a youth growing up in Utah, Dr. Ganz recalls that "if a woman couldn't nurse her baby, the grandmothers (many of whom arrived in Salt Lake City in covered wagon trains as early Mormon converts) viewed the infant's prognosis with tears of sadness."

Formulas for babies whose mothers could not nurse were developed in the late 1890s. A pioneer in the field was Harvard Professor of Pediatrics Dr. Thomas Morgan Rotch, whose textbook on pediatrics was first published in 1895.

These early formulas were called "percentile mixtures." "You had to be awfully good at mathematics to make up an individual formula," said Dr. Ganz.

A program to provide human milk for those infants whose mothers could not provide any was developed by Dr. Fritz B. Talbot, first Chief of Pediatrics at the MGH. With the aid of visiting nurses, the Directory for Mothers' Milk, Inc. was in operation from 1920-1955.

The milk was given to premature infants and those with difficult digestive problems. After World War II bottle feeding became popular for two reasons: cleaner production of commercial milk, and a growing work force of women who could not nurse babies on the job.

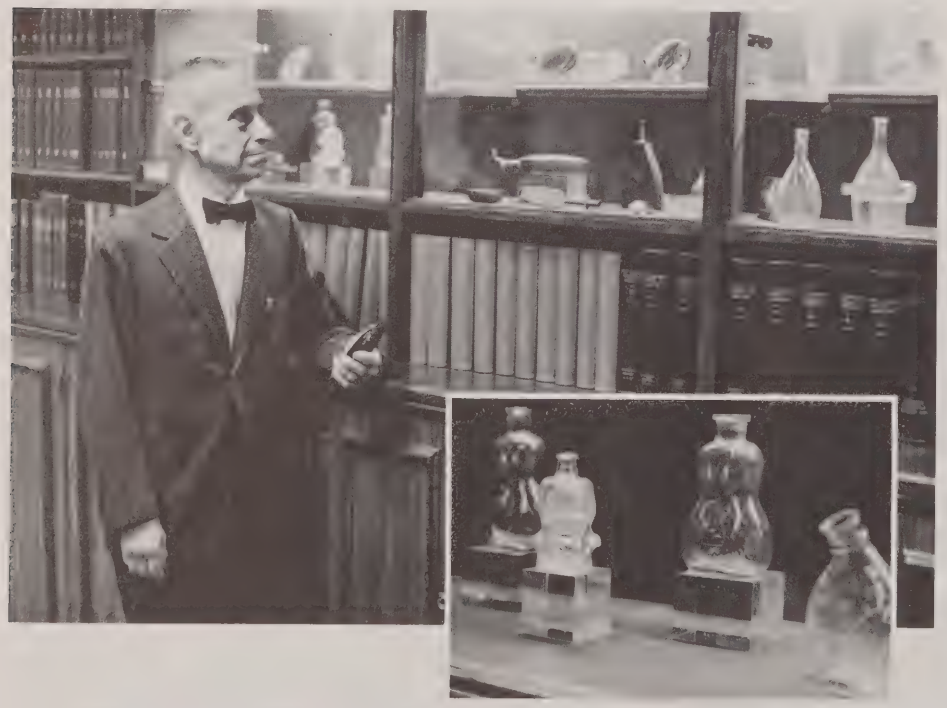
"Early nursing bottles are difficult to obtain," said Dr. Ganz, "because very few used them." The earliest feeding bottle, now in the British Museum, dates from 1900 - 1800 B.C. Dr. Ganz' collection is made up of American bottles, some as old as the eighteenth century. Included in his collection are bone or ivory nipples for bottles, ivory pacifiers, and tin rattles.

Papboats, dishes resembling a sauceboat without stem or handles, were often used to feed infants in earlier times. Pap, a mixture of bread crumbs, water, and sugar, was often given as a substitute for milk. Dr. George Armstrong, a British pediatrician whose *Essay on Nursing* was published in 1772, advises the use of pap and papboats for infants "who are bred up by hand." They were easier to use than a bottle with a rag or sponge or cow's teat for a nipple.

Dr. William Cadogan wrote *An Essay Upon Nursing, and the Management of Children, London, 1750.* It is a treatise against child-rearing practices of his time, when babies were considered adults in miniature. He wrote: " . . . The heir and hope of a rich family lies languishing under a load of finery that overpowers his limbs, abhorring and rejecting the dainties he is crammed with, til he dies a victim to the mistaken care and tenderness of his fond Mother."

And on nursing: "No other Woman's milk can be so good for her child; and dry-nursing I look upon to be the most unnatural and dangerous method of all. According to my observation not one in three survives it." He continues, "A Child may be allowed any kind of mellow fruit, either raw, stewed, or baked; roots of all sorts, and all the produce of the kitchen garden."

Dr. John Ruhrah, a pediatrician who in 1925 compiled and edited the book *Pediatrics of the Past,* notes that "the modern [1925] book on the feeding of infants has gone back to the early [1750] custom of allowing other foods than milk during the first year." As Dr. Ganz noted, however, the shift is now toward withholding food until the infant's digestive and immunological systems are adequate to handle it.



Dr. Robert N. Ganz, a member of the MGH Senior Consulting Staff, looks over the collection of antique feeding bottles that he donated to the hospital. His personal collection of various objects of pediatric interest includes antique carrousel animals, books, toys, and prints. Inset (lower right) shows four of the bottles including the one (second from left) with baby's face etched on bottle shaped like an infant's head.

New Method Gauges Relief From Pain

To measure pain for the acupuncture experiment doctors will use an MGH procedure called submaximum effort tourniquet technique.

It employs a device which the volunteer squeezes 20 times with one hand. The effort involved is not great, but it is measured precisely. This work ordinarily would not induce pain.

However as part of this technique, a tourniquet positioned on the arm of the squeezing hand remains in place for the duration of the experiment. Cutting off the circulation prevents the normal removal of the work by-products which then produce pain because they remain concentrated in the arm.

At irregular intervals after the experiment begins, the investigator asks the volunteer whether the pain is nonexistent, slight, moderately distressing, very distressing, or extremely severe. These subjective feelings are assigned numbers from 0 (no pain) to 4 (extremely severe).

Plotted on a graph showing degree of pain over a period of time, the results normally indicate a steadily increasing amount of pain which for the most stoic person would last 60 minutes. Since some people tolerate pain better than others, the graph for one person would differ from that of a second. However, carefully controlled tests show that for a particular person the rate of development of pain remains relatively constant no matter how many times the experiment is repeated.

The technique, developed by Dr. Gene Smith, an MGH psychologist, is used to measure the reduction in pain resulting from new medication compared with standard analgesics such as aspirin or morphine. This is accomplished by giving the new medication before inducing the pain. The rate of pain development during the test is then compared with that produced when the person took a standard medication and with that produced by exercise after the person took an inactive "medication." The purpose of the latter test is to make certain that the pain reduction really results from the test drug rather than from a psychological effect.

Now the investigators plan to measure the amount of pain relief – if any – that results from using acupuncture after the squeezing exercise. This result would then be compared to those obtained from known pain relievers such as aspirin.

In addition Dr. Han Chiang, the acupuncturist, will sometimes purposely stick the acupuncture needles into areas slightly removed from the exact points that are believed necessary to be hit for the relief of pain. If the correctly placed needles reduce the pain significantly more than deliberately misplaced needles, the implication would be that acupuncture does somehow work.

If both the correctly and incorrectly placed needles reduce the pain about equally, the implication would be that acupuncture probably works in some other manner.

Device squeezed to produce pain

World of Employee Does a Turnabout

(Continued from Page 8)

One MGH accountant was motivated to work in the hospital because of the excellent care he had received in European hospitals during a lengthy illness. He has since received a transplanted kidney here. Although he has little direct contact with patients, he does help arrange meetings for a group of former MGH kidney transplant recipients who have recently formed a club.

"Hospitalization," as one surgeon said, "is the great leveler." But when nurses become inpatients, they do not seem to find the change in roles as difficult as physicians do.

Two nurses reported the ease with which they switched from nurse to patient, especially the first few days after surgery. Once over the initial discomfort, however, one nurse said she began to evaluate her nursing care and form comparisons with her own experience as a head nurse.

"They were all competent in their nursing techniques, but the nurses I liked best were the ones who were good conversationalists and were pleasant," she recalled.

Another nurse, operated on for a back problem, found the experience directly valuable in dealing not only with the other three patients in her hospital room during convalescence but also when she returned to work with patients on an orthopedic floor.

"I do far more teaching now with patients," she said, "because I remembered that my hospital roommates always had questions but were hesitant to ask the staff."

Even before they become patients, medical personnel are often more aware than others of hospital practices. Yet, they many times expressed the wish that someone had explained an unfamiliar procedure or prepared them for what to expect preoperatively and postoperatively when they were patients.

Hospitalization, as "the great leveler," draws many of those who experience it into a camaraderie. Whether physician, nurse, or hospital employee, all take from their experience something of value to their work. And all agree on one point: the best part of being a patient in any hospital is going home!

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The World of the Employee Does a Turnabout

Like Alice stepping through the looking glass, MGH workers who become patients must suddenly adjust to being on the inside looking out. Perspectives change. The surgeon is *on* the operating table. The nurse is *being* cared for. The world of the person used to caring for patients does a turnabout.

And once the physicians, nurses, and nonprofessional employees are back at work in the MGH after hospitalization, they often implement changes in their jobs based on their own experiences as patients.

One hospitalized employee was in a unique position to effect a change in patient service once he went back to work. As the Assistant Director of Building Service, one of his responsibilities is to see that the rooms of discharged patients are cleaned and the beds freshly made for persons being admitted. During his own admittance, because the bed had not been made, he experienced a considerable delay before he could go to his room.

Consequently, a few months ago a new teletype communication service was installed from each patient-care floor to the office of Building Service. The new system provides a faster, more efficient check on rooms to be prepared for incoming patients. The supervisor of each patient-care building now can quickly direct his corps of workers to empty beds.

One MGH surgeon underwent an abdominal operation when he was a resident-in-training here several years ago. He reports that he prescribes more pain medication for his patients now than he did as a resident.

"Older people seem more tolerant of pain after surgery," he said, recalling that his father's discomfort after a similar operation was minimal. "But I evidently felt it more, so that now if a patient really complains of discomfort, I know from experience what he means."

He thinks that many doctors make the worst patients, both for their own physicians and other personnel involved in their hospital care.

"I was probably something of a terror," he recalls. "I found it very difficult to play the role of patient and wait for things to be done for me. One morning when my bed wasn't made up when I thought it should be, I took the sheets off myself and put them in the corridor."

The bed was promptly made, but he too became aware of the nurses' heavy work load on a busy surgical-care floor. The lesson was twofold: the comfort of patients and their nursing care must be dovetailed to accommodate both the patient and staffing capabilities.

The general theme of more empathy with patients underlies all the specific comments by those employees interviewed, whether they be in Accounting, Dietary, or Admitting.

A physician on the MGH Board of Consultation wrote of his experience before and after open-heart surgery: "Angina [chest pain due to coronary-heart disease], which so many patients had described to me, was much more uncomfortable to experience personally than to hear about in others. . . . Convalescence for a physician adds immeasurably to his understanding of illness and his empathy for other patients."

A diet aide who also had open-heart surgery concurs. An understanding of what others feel shows through in many ways that employees can express when they come in contact with patients or perform their patient-related jobs.

(Continued on Page 7)

George A. Holly, Jr., Foreman in Building Service, checks teletype for rooms ready to be prepared for incoming patients.

MGH News

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Using a Costly Cyclotron Saves Patient Dollars

Peg Legs to Plastic: A Giant Stride Forward

"We don't put people on peg legs anymore," commented John M. Snowden, C.P.O. (Certified Prosthetist Orthotist). From peg legs to plastics is a giant stride forward in knowledge and sophisticated treatment for patients who need support or correction for muscular, nerve, or bone disabilities. Plastic is the material of choice for artificial limbs as well.

The most recent utilization of plastic in orthotics (the design and fabrication of supportive and corrective devices) is in below-the-knee braces. Various types of plastics have been used for years for upper-extremity (arm) braces and spinal braces. Conventional metal alloy or steel and leather braces are still widely used, especially for above-the-knee corrections.

"Right now we're doing more plastic below-the-knee braces than we are conventional," said Mr. Snowden, who recently came to the MGH from the Hospital for Joint Diseases and Medical Center in New York. "It's about 70 percent plastic and 30 percent conventional." In a two-month period since November he has fitted about 75 below-the-knee plastic braces in the MGH Orthopedic Shop.

The material used is high molecular weight polyethylene. To fit the brace, the orthotist makes a plaster "negative" of the patient's lower leg and foot. The negative, similar to a cast, is then filled with plaster of paris to form a "positive" model. Any modifications to relieve pressure in bony areas, increase pressure in soft-tissue areas, or correct alignment or arch support are made at this stage.

A sheet of plastic is then heated, stretched, and molded over the plaster form. After trimming the plastic, its edges are smoothed, and a nylon Velcro strap is attached to the top.

"You can increase the flexibility by the way you trim it," said Mr. Snowden. "You can vary the design for each patient's needs more effectively than with a conventional brace. What I find more and more is that I don't use the same design on any two patients. With the versatility of the material it can be trimmed accordingly to support the individual's particular muscle weakness."

The initial cost to the patient for a

(Continued on Page 2)

New plastic below-the-knee brace (left) fits inside the shoe. A conventional metal and leather brace must be permanently attached to the shoe.

When is it cheaper to use an expensive device than a conventional one? When the expensive one considerably reduces a patient's hospitalization.

A cost study of operations performed three different ways by an MGH surgeon appears to drive home that message. In each case the medical team chose the method best suited to the particular needs of the patient. But the technique most frequently selected also saves considerable money for such patients and is economical of hospital space and time.

The patients have come from various parts of the world. The diseases treated all involve a tumor of the pituitary, a gland which lies at the base of the brain.

The neurosurgeon does one procedure on the cyclotron built by the Navy at Harvard University. For two other procedures performed for the same diseases he must use the conventional operating room. Surgical fees are relatively similar for each technique.

Using the 160-million electron volt cyclotron, however, turns out to cost the patient much less. For one of the other types of surgery the patient is billed an average of $5,005 for hospitalization. A second type of operation costs an average of $2,713 in hospital bills. But hospitalization for the cyclotron technique totals an average of only $1,569. In all three cases the average charge includes use of the operating room or cyclotron plus all other nonphysician charges resulting from the hospital stay.

"Most of this difference in cost,"

(Continued on Page 4)

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EDITORIAL:

Putting a Price Tag on Life

The use of the Harvard cyclotron provides a paradoxical kind of object lesson in the cost of medical care. What makes the expensive device comparatively inexpensive for the patient? As described in a page 1 article, the main saving derives from the greatly reduced hospital stay after use of the cyclotron rather than the conventional operating room. But what goes into the high cost of hospitalization?

Hospital charges do not include physician fees. They fall into two categories: room rates and ancillary or special services. Patients often try to compare a hospital's room rates to a hotel's. In a few regards the comparison is valid. Both include such items as the cost of making beds and cleaning the rooms. But even here the comparison breaks down. A hotel cleans the rooms. Often a hospital must sterilize them as well. Even ignoring these factors, one finds that only about 10 percent of the average total room rate and special charges at the MGH last year fell into the so-called hotel expense category.

For the most part, however, no valid way exists to compare hospital and hotel room costs. Hospitals must provide 24-hour-a-day, seven-day-a-week nursing care, social services for helping patient families as well as patients, medical records, etc. Indeed some intensive-care units at the MGH daily average 30 hours of nursing care per patient. In such cases patients avoid private-duty nursing costs and gain nurses specially trained to render the exact kind of care they need. If the institution is a teaching hospital like the MGH, it has interns and residents to back up the senior physicians. In turn these house officers are available around the clock in case an emergency develops when the private doctor has gone home. The room rate includes the cost of preparing food for persons on a variety of special diets. These are some of the items that comprise a hospital room rate and many of them are expensive. During the last fiscal year, for example, it cost $46.77 per day to provide nursing for the average patient. This represents more than half of last year's average room rate of $86.61 per day.

The special services last year cost the average patient another $68.97 per day. These services include such items as the operating-room charges, anesthesia, X-ray diagnosis, X-ray treatment, a variety of laboratory tests, physical, recreational, and occupational therapy, respiratory therapy, intravenous therapy, central sterile supply, and pharmacy.

What does the patient obtain for his money? Sometimes despite valiant efforts there is no improvement. Much more often he receives improved health or even his life in return. These are "commodities" on which it is difficult to place a price tag.

New Plastic Braces Offer Many Benefits

(Continued from Page 1)

plastic below-the-knee brace is slightly higher than for a conventional one. In the long run, however, money is saved.

"You can spend $650 on an above-the-knee plastic brace, but if that device is going to get the patient out of the hospital 10 days faster, then you've already justified the cost," Mr. Snowden said.

The brace fits inside the shoe, saving the expense of having each new shoe attached. "There are no metal parts that wear," continued Mr. Snowden, "and there's relatively no maintenance at all. Patients are pleased to find that you can't see the device if an opaque stocking is worn over it.

"Very few hospitals have a brace shop. We're trying at the MGH to provide total orthopedic service within the hospital. When you can do that, it's a saving of time and money to the patient. Often you can't discharge a patient until you fit him with a brace.

"If the hospital cannot provide this service from within, it is at the mercy of outside manufacturers for properly fitting a device and delivering it quickly. The cost of transporting patients to and from an independent brace shop can be expensive.

"You may end up having a patient in the hospital 10 days longer than he need be, waiting for his prosthesis or orthesis [from a commercial firm]," said Mr. Snowden.

Besides vastly improved appearance and ease of care, plastic braces offer many advantages over metal and leather. They weigh less, sometimes as little as one fourth a conventional brace. In some disabilities involving progressive weakness, the difference in weight offers the patient a choice between walking and a wheelchair.

A more accurate matching of body and orthotic joints contributes to a more natural leg motion with improvement in the rhythm of gait.

In a conventional brace, only the tight leather bands hold the leg. With plastic braces the pressure in those areas is reduced because there is an improved correction of the deformity with better alignment of muscles and bone.

"A child, while he is growing, can benefit from the good fit and support of a plastic brace," said Mr. Snowden.

William J. Murphy, C.O. (left), head of the Orthopedic Shop, checks the fit of a plastic brace on a model of a patient's lower leg and foot. John M. Snowden, C.P.O., compares a conventional brace with the newer type.

Eleanor T. Medeiros, MGH operating-room aide, is fitted for a plastic brace by John M. Snowden, C.P.O.

"Sure, he's going to grow out of it, but we can utilize some metal components that are extensible."

Although Mr. Snowden's responsibilities are not centered in the Orthopedic Shop, which is headed by William J. Murphy, C.O. (Certified Orthotist) and makes orthotic devices and temporary prostheses, he has been training employees there to fabricate the new lower-extremity braces.

Under the auspices of the Orthopedic Department he acts as a consultant to the Rehabilitation Unit, Rehabilitation and Amputee Clinics, and the physical therapists. He also consults with surgeons on artificial limbs or braces for any MGH patient who may benefit from such a device, all a part of total orthopedic care.

Mr. Snowden checks fit of a temporary below-the-knee prosthesis on Charles Tortorici.

Dr. Mary C. Howell Undertakes New Role

In March of 1972 the MGH News *wrote a tongue-in-cheek editorial about the first woman dean in Harvard Medical School history. While no member of the female sex has yet sat in the dean's chair, the walls of the medical school have been breached.*

Dr. Mary C. Howell, MGH Assistant Pediatrician and Chief of the Behavior Unit on the Children's Service, was named Associate Dean for Student Affairs at Harvard Medical School in September. She is the first woman in the history of the school to be appointed to a deanship. The News *recently interviewed her to learn her views on the changing role of women in medicine as well as to learn more about her own varied career in private practice, public health, psychology, and the unit that she heads at the MGH.* [Editor's Note.]

Q. Dr. Howell, what are some of the things your new position at Harvard Medical School involves?

A. My responsibility is for student affairs, not only for women students but for men students as well. But many of the things that I end up assisting people with start out as concerns of women. For instance, a group of students, both men and women, are trying to propose to various hospitals in the Boston area a concrete program for flexible-time postgraduate training for their internships and residencies; that is, half time or three-quarter time. The argument is not that women need such programs, but that parents, both mothers and fathers, need them. Interns and residents work anywhere from 48 to 168 hours a week according to our recent data, and this can be a considerable disruption of family life. I am currently taking a survey of residency programs, and many of them express an interest with regard to *women* and their family responsibilities. Some, although not all of them, are forgetting or ignoring the fact that men have a relationship with their families. There are more and more young men now who feel they can say that and don't have to be embarrassed about it. I think we would be very fortunate if we had a number of those programs in 10 years, but to accomplish that we must start now. Change will come slowly, but it will come.

(Continued on Page 6)

Cyclotron Saves 8 to 16 Days of Hospitalization

(Continued from Page 1)

said Dr. Raymond N. Kjellberg, "can be accounted for on the basis of the shortened hospitalization because the patients leave the hospital almost uniformly the second day after the [cyclotron] procedure." Dr. Kjellberg, the surgeon involved in the cases, and Dr. Bernard Kliman, the medical physician, compiled the financial study from experience with the recent patients among the more than 350 hospitalized persons in the past decade.

In contrast to the cyclotron patients, those undergoing an alternative method called transsphenoidal hypophysectomy require an average of from 10 to 16, or even to 18, days. The variance among those three time periods depends on which of three types of conditions is being treated.

For these same three conditions operated on by a method called frontal craniotomy, the hospital stay averages 16, 17, or 18 days. With the cyclotron the stay averages only two days regardless of which of the three pituitary tumor conditions is involved. At a day rate of roughly $100, plus supplementary costs, the saving on reduced hospitalization becomes substantial.

But a different type of saving extends beyond the hospital doors.

"If a patient still has one to three months to convalesce at home," Dr. Kjellberg said, "you really have another monetary factor. From the patient's viewpoint that's lost income, and that can be substantial in these times."

After a cyclotron-procedure patient is discharged, he normally can return to work immediately. Furthermore the noncyclotron surgery is often followed by one month of hospitalization or daily outpatient visits for X-ray therapy.

Although patients who undergo surgery have more extensive disease than the cyclotron patients, the only successful alternative is that kind of surgical procedure with its attendant costs.

The three conditions for which the cyclotron receives almost all its medical use are acromegaly, Cushing's disease, and chromophobe adenoma. In acromegaly the pituitary tumor pours out too much growth hormone. As a result the head and face, hands, and feet grow progressively larger. Diabetes, high blood pressure, and arthritis develop if the condition is not treated.

In Cushing's disease the tumor causes several problems including diabetes, high blood pressure, and a loss of calcium from the skeleton. Also the result of a pituitary tumor, chromophobe adenoma may enlarge to interfere with vision or cause hormone disturbance affecting sexual, thyroid, or adrenal function.

Based on criteria they have established, Drs. Kliman and Kjellberg choose one of the three surgical treatments for patients with any of these three diseases. Dr. Kliman is Associate Professor of Medicine and Dr. Kjellberg, Associate Clinical Professor of Surgery, at Harvard Medical School.

They regard the cyclotron as the treatment of choice for most people. None of their 323 patients undergoing this procedure for proton-beam bombardment of the tumor has died during such treatment. Undesirable side effects have not been numerous and almost always are mild and temporary. The patient walks unassisted to and from the treatment room and does not require general anesthesia with its attendant risks.

However, sometimes the tumor extends too close to the optic nerve to make the irradiation safe. Excessive prior radiation treatment on the tumor

Technicians assist Dr. Raymond Kjellberg in fixing the stereotactic head frame to the patient's head.

Chart compares cost of two methods (first two columns) used in the conventional operating room and a third technique with which a cyclotron is utilized (third column).

	OPEN		
	Frontal Craniotomy	Transsphenoidal Hypophysectomy	Bragg Peak Proton Beam Hypophysectomy
AVERAGE	$5,005	$2,713	$1,569
MINIMUM	$4,227	$2,338	$ 855
MAXIMUM	$6,501	$3,154	$2,391

also renders the technique less safe. In either of these uncommon instances, one of the more extensive and more costly treatments becomes mandatory.

Dr. Kjellberg does both of the other types of operations under the lenses of a microscope. The less complicated and less expensive of the two is called transsphenoidal hypophysectomy.

Entering behind the upper lip, the surgeon reaches the pituitary through the nasal cavity. The operation consumes roughly three hours.

If the tumor reaches extensively toward the base of the brain, a longer and more serious procedure (roughly five hours) called transfrontal craniotomy becomes necessary. The surgeon makes the incision in the front of the head, folds the skin of the forehead down over the eyebrows, and makes a window in the bone. He then elevates the frontal lobes of the brain to enable him to reach between the optic nerves down to the pituitary and remove the tumor along with the pituitary gland.

Even though either of these two lengthy operations proves successful, the patient often must take medication for the rest of his life. This replaces hormones that the normal pituitary tissue was able to manufacture before its surgical destruction.

In contrast the cyclotron procedure takes an average of only 90 minutes. About 10 percent of the patients undergoing it require some medication. One other cyclotron in the nation – at Berkeley, Calif. – is used for pituitary tumors.

Until recently the MGH has been the only hospital in the world to stop the ravages of these conditions with a single radiation treatment. What made this possible is the use of a cyclotron with a special technique called Bragg peak (November 1969, *MGH News*). However, surgeons from France and England have visited the team here with a view to developing the method for their own use.

(Andreas Koehler and William Preston, Ph.D., members of the Harvard University Physics Department, have contributed to the development of the technique.)

And within a year physicians at Berkeley are also planning to use the method routinely. About half the estimated 300 new cases of acromegaly in the country each year are treated with either the MGH or Berkeley cyclotron.

"Two cyclotrons in the United States are ample for the national needs of such a resource," Drs. Kjellberg and Kliman said in January at Bethesda, Md., at the International Conference on Diagnosis and Treatment of Pituitary Tumors. "Our cyclotron at Harvard University is used for medical therapy purposes 12 to 18 days per year and perhaps 10 days per year for other purposes. The remaining time it is idle.

"A multiplication of medical cyclotrons would make them all prohibitively inefficient unless substantial expansion of cyclotron applications were to occur.

". . . The cost of air travel to the cyclotron from mid North America is approximately equivalent to the cost of one day of hospitalization."

Cyclotron patients have journeyed to the MGH from 41 states, 6 Canadian provinces, Central and South America, and Europe. In just 10 years the cyclotron has thus become an established means of treatment.

"Since the patients have come from a distance," Dr. Kjellberg said, "we don't necessarily know them nor do they know us. A complete evaluation of the patient, X rays, records, and medical tests precedes the treatment. Any essential diagnostic tests are performed at the MGH during a four- or five-day period.

"We're never quite sure what the patient's understanding is of the procedure. Dr. Kliman and I start off by explaining the basic nature of their illness and how it's proposed that they be treated. We also describe the alternative treatments.

"We discuss the nature of the procedure. Since it is done under local anesthesia, they have to remain cooperative and calm. During the orientation surgeon and patient should get to know each other better so they are comfortable and confident throughout the course of the procedure.

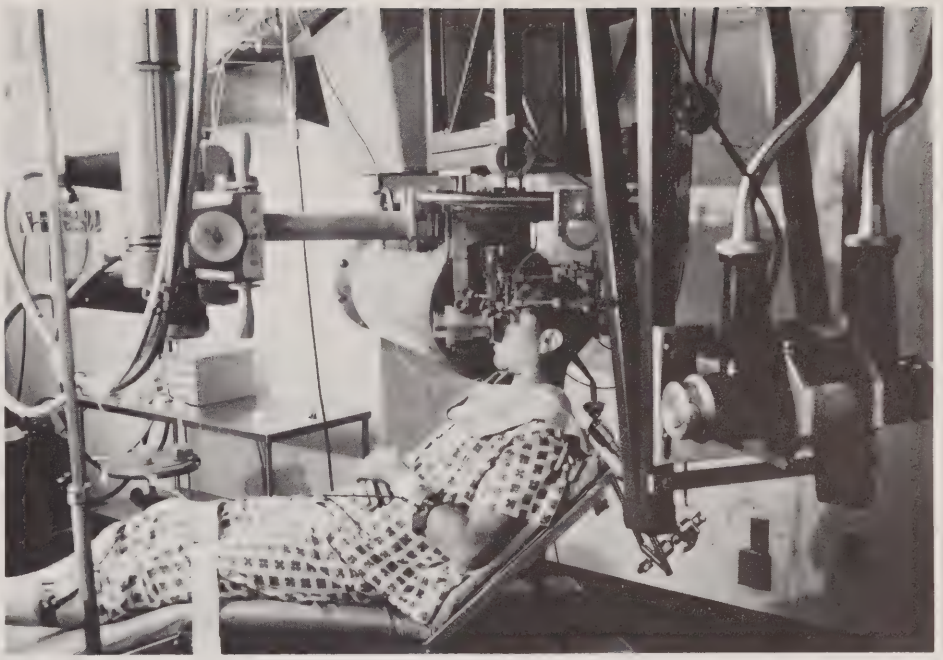
"Our nurse technician, Billie Swisher, goes over some of the same points. By virtue of repetition the patients really get the message about what the treatment is like and about its purpose. I think it provides reassurance to hear different people describing the same points in the same way. By describing things in detail we can put their minds at rest."

Two points are emphasized. First the patient requires injections of local anesthesia in each ear canal and at the four places on the head surface where the positioning instrument is applied. That produces the usual type of pain associated with a needle puncture.

In addition patients find it tedious to sit with their heads held in a fixed steel device for 90 minutes. Alerted beforehand, they endure the tedium quite well.

During the procedure the surgeon and Harvard University personnel remain shielded around the corner from the patient but within his hearing. They view the operation over closed-circuit television and carefully control the amount of very precisely delivered radiation.

Not all patients are helped. But depending on the type of disease, from 80 to 90 percent either improve or obtain complete relief of their symptoms.



Harvard cyclotron beaming protons at tiny target in patient's head

"Change Will Come Slowly, But It Will Come"

(Continued from Page 3)

Q. What changes do you see in medical education for women?

A. At the student level, I see women beginning to talk to each other and be supportive of each other, which never used to happen in medicine. Because of that they are faring much better, both psychologically and in the kind of patient care they provide. Women in our society are taught to be competitive of each other and not to trust each other. If you add to that a whole premedical ethic of 'Get A's; don't let anybody see your paper because you have to beat the other person' it has meant that women in medicine can hardly resist becoming individualistic and competitive. Of course there have been exceptions to this. In recent years women in medical school are sharing their various experiences which makes an enormous difference in how they feel about themselves and in their ability to give really fine care to patients.

Q. How have recent changes in legislation on equal employment and the feminist movement affected professional women?

A. I think the changes in legislation will have a mixed effect. I know of professional women who used to know that they were chosen for their competence. Now they wonder if they are chosen because of the legislation. I understand in some educational institutions more women *are* being hired, but in non-tenured positions, creating a sort of rotating pool. Women come in and women go out, but the number of women in tenured positions still has not changed.

Dr. Mary C. Howell, Associate Dean for Student Affairs at Harvard Medical School

Q. Could you relate some of your professional experience?

A. I was a linguistics undergraduate of Radcliffe with no premed courses. We had one child before I started my premed work and another when we were fourth-year medical students. I did all my graduate work in psychology and medicine at the University of Minnesota. Then I came into a general pediatric practice in Haverhill and learned enormous amounts from a primary-care practice that I had never learned in a big city referral hospital. After five years in practice I had a chance to go to work for the State Department of Public Health to try and set up a program in group day care for infants. We wrote rules and regulations for group infant day care, but this has not yet been allowed in Massachusetts. That was in '69, and regulations still haven't been passed by the legislature. So I was invited to come to the MGH by Dr. Talbot [Dr. Nathan B. Talbot, Chief of the Children's Service] and left the State Department of Public Health in some despair over the fact that progress in day care was going to take a long time. Maybe no longer than getting part-time residencies!

Q. The problems of child care loom large for working mothers. As a working mother yourself [Dr. Howell and her husband have six children], how have you managed?

A. I suppose we've used every arrangement there is. My husband is a surgeon, and he is as thoughtful and considerate of his patients' welfare as any doctor I know. But he is also very active in every part of our family life. I have just finished writing a long paper reviewing all the literature on the effects on families with mothers in paid employment. Everybody 'knows' that's jeopardy for kids. But there is no good evidence from research to support that idea. Last year 42 percent of all mothers with children under 18 were in paid employment. This year it's expected to be 45 percent. They're hardly an unusual group, but they continue to be looked at as deviant and odd. It is estimated that something like 1.6 million children under the age of 2 have employed mothers. If that is considered a social problem, it's a big social problem.

Q. What are your responsibilities at the MGH?

A. We have two programs going here. One of them, the Family Evaluation Unit, is an interdisciplinary program to assist pediatricians on the staff in the behavior and social aspects of patient care. Social workers from the Children's Service and child psychiatrists work with us. We try to see a patient and his family very quickly, gather as much information as we can in a short time so that costs don't get out of hand, and meet with the pediatrician in a matter of a week or so. We can say, 'this seems to be the problem, and this seems to be the best direction to go for treatment.' We're not a treatment unit. We are really a teaching, demonstration, and service unit for prescriptive diagnoses.

Q. Is this unique to the MGH?

A. We're unique in the speed with which we manage to see families because child-guidance clinics and diagnostic units frequently move at a slower pace. We are much less successful than we'd like to be because in many cases services are simply not available to help families in the ways in which they seem to need help. Many families say that just our intervention, that week of interviewing and talking and thinking about their problems, made an enormous difference and was helpful to them.

The other program is the Street Youth Program, which is interdepartmental, a joint program of Pediatrics and Psychiatry. Psychiatry is part of the program because we work with the Acute Psychiatric Service and drug abusers. We are basically a patient advocate program for youth between the ages of 12 and 25. About one third of our work is counseling for drug problems, one third for life difficulties where drug detoxification may be a smaller part of some larger difficulties, and one third patient advocacy. The kinds of people who come through this program tend to be mistrusting of the system and easily discouraged from sticking with it. They often don't get health care, or they don't get as good care as they might.

Q. What is the significance of these two programs?

A. The importance is they are interdisciplinary. One way for an established system to change is to develop common ground between traditional types of care. These programs represent progress in this direction.

Honorable Practitioner Respected by Brethren

(Continued from Page 8)

of Rudolf Virchow, the renowned German pathologist with whom he had studied and published a scientific paper.

Returning to Boston in the fall of 1870, Fitz was appointed instructor in pathological anatomy at Harvard Medical School. Previous to his appointment pathology had been taught without the aid of a microscope and was based on the study of whole organs rather than cells. Within a year he was appointed Microscopist and Curator of the Pathological Cabinet at the MGH. The title was shortened in 1888 to Pathologist.

In spite of his title, however, Fitz was never a narrow specialist. He maintained an active general practice, believing that sound patient care should be based on a thorough knowledge of diseased tissue. His paper on acute pancreatitis is an example of the correlation of patient symptoms with lesions. He relates in the introduction that "My interest in the disease began in 1876 when a Dr. Maynard of Dedham asked me to do a postmortem on a woman who collapsed and died in 30 minutes."

During his long association with the medical school Fitz was instrumental in changing and updating the curriculum. He was Secretary to the Medical Faculty (1874); a member of the committee on the course of study (1881-1908); appointed Shattuck Professor of Pathological Anatomy (1879); and later Hersey Professor of the Theory and Practice of Physic (1892).

Usually regarded as cold and analytical, he was a stimulating teacher, although his students often feared the sting of his sarcastic humor. One former pupil wrote, "He had a habit of tilting his head backward, closing his eyes, talking with extreme rapidity and fluency, never missing a word, for 61 minutes in the hour, to the despair of each of us who tried to take notes. It was as if he read a carefully prepared lecture from the inside of his eyelids."

Dr. Nathaniel W. Faxon, a former MGH General Director, wrote that ". . . Dr. Fitz made the most lasting impression upon me as a teacher of any of the faculty of the Harvard Medical School during my student years." The third- and fourth-year classes held in the MGH Ether Dome were "the most valuable as well as the most trying and even embarrassing exercises."

A short, energetic man with a bristling moustache offsetting his baldness, his deep-set eyes could skewer a medical student as well as a pathological specimen. One who felt the pain likened him to a prosecuting or criminal attorney.

His ability to antagonize as well as inspire may have been the explanation for a series of letters between Fitz and the MGH Trustees and the Medical Board in the spring of 1886. For two years, Fitz had desired Visiting Physician privileges at the MGH. He submitted his resignation when he didn't receive them. Someone evidently did not want Fitz to have them.

After what must have been behind-the-scene skirmishes, Fitz triumphantly wrote the Medical Board withdrawing his resignation. The following year he was elected by the Trustees as Visiting Physician to the MGH. During the intervening months he had achieved wide acclaim for his paper on appendicitis.

The remaining years brought two honors: he was elected President of the Association of American Physicians in 1894 and President of the Congress of American Physicians and Surgeons in 1907. In 1913 after surgery for a bleeding gastric ulcer, he died, leaving a legacy of excellence in patient care, teaching, and research for which the hospital is still recognized.

His original work on acute pancreatitis was only the beginning of research on the pancreas at the MGH. In 1957 it was discovered that pancreatitis is sometimes a complication of hyperparathyroidism (November 1972, *MGH News*) and is a good diagnostic clue to the latter disease, often subsiding when hyperparathyroidism is treated.

In 1966 Dr. Kurt J. Isselbacher and his associates in the Gastrointestinal Laboratory studied the relationship of pancreatitis to hyperlipemia (an excess of fat in the blood).

More recently, a surgical approach to the most severe type, acute necrotizing pancreatitis, has been developed by Drs. Andrew L. Warshaw, Willard M. Daggett, Dexter W. Lawson, Joseph M. Civetta, Anthony L. Imbembo, Robert J. Corry, and Marshall K. Bartlett.

A high mortality rate in surgical intervention during the early part of the century has led to a conservative medical treatment since the 1930s. In 95 percent of patients at the MGH this treatment is effective.

Surgical therapy, reserved for the remaining patients in whom medical treatment has failed, is successful in saving about two thirds of those patients. The operation involves gastrostomy (stomach decompression), cholecystostomy (gallbladder decompression), jejunostomy (insertion of an intestinal feeding tube), and pancreatic and abdominal cavity drains.

Although neither Fitz nor modern doctors know the causes of pancreatitis, due to Dr. Fitz it was recognized as a not-uncommon disease. Former Dean Edward H. Bradford of Harvard Medical School said shortly after Fitz's death, "Many have sought truth, but it is rare to have found and taught it so clearly that the lives of thousands and thousands were saved thereby."

A turn-of-the-century picture of Dr. Reginald H. Fitz (left) on Ward 16 for female medical patients

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He Put Acute Pancreatitis on Medical Map

It is well known that appendicitis is one of the diseases in which the MGH has made a major pioneering contribution. Few people realize that the same MGH pathologist who identified appendicitis also made a key contribution to the understanding of another disease – pancreatitis. What follows is a sketch of the man and his achievements. [Editor's Note.]

Thousands have succumbed to "Fitz's disease," only to recover dramatically by quick surgical intervention. One who did not was Harry Houdini. "Fitz's disease"? Houdini?

It was in 1926 that Ehrich Weiss, better known to the world as Harry Houdini, magician and escape artist supreme, ignored his painful symptoms and died needlessly at the height of his career. But just as Ehrich preferred to be known by his stage name, so too did Dr. Reginald Heber Fitz. The name he chose for "Fitz's disease" was appendicitis.

He wrote, "The word was coined by me purely for practical purposes. I wished to call attention to inflammation of the vermiform appendix as the primary lesion and that to which treatment was directly to be applied. . . . I much prefer appendicitis to Fitz's disease."

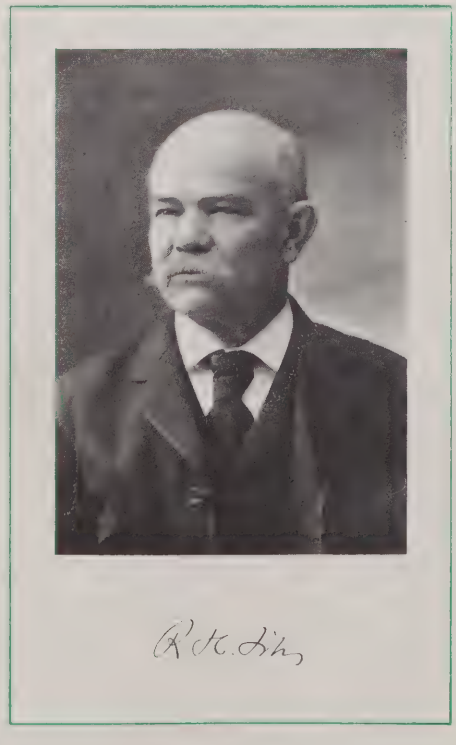
Dr. Fitz, in 1886, not only crystallized the thinking of his colleagues throughout the world on appendicitis but three years later he also put acute pancreatitis on the medical map. His papers on the subjects are considered classics for their clear, incisive, logical presentation of disease processes.

Acute Pancreatitis: A Consideration of Pancreatic Hemorrhage, Hemorrhagic, Suppurative, and Gangrenous Pancreatitis, and of Disseminated Fatnecrosis was the mind-boggling title of The Middleton-Goldsmith Lecture for 1889, which he delivered before the New York Pathological Society. It was subsequently published in *The Boston Medical and Surgical Journal.*

In his paper he presented a thorough review of past literature describing the disease, a critical analysis of pathological material correlated to symptoms of patients, and a reorganization of the facts known about pancreatitis.

The brilliant and logical medical analysis was representative of the personality of the man. Becoming a physician, however, was not in his plans, nor was it financially possible during his youth.

One of seven children, he was born in Chelsea in 1843. His father was private secretary to Daniel Webster, and through connections in Washington was appointed U.S. Consul to Haiti. When his wife, Eliza, met the ship in Boston supposedly bringing her husband from Haiti to take the family back with him to his consulate post, she received instead a letter informing her of his death from yellow fever.



Dr. Reginald Heber Fitz

Left with a large family and no income, she opened a school in Brookline for "fashionable young ladies." The school flourished, but the specter of poverty was a strong influence on Reginald and his older brother Scott.

An average student at the Chauncy Hill School (with a tendency toward messy papers embellished with artistic doodles), Reginald entered Harvard with no great enthusiasm at the "urgent wish of [his] mother." His son later wrote of his father that "the academic atmosphere of college life seemed to him stifling and dull . . ." Brother Scott, meanwhile, was prospering in a China-trade shipping company.

An early version of today's college dropout, Fitz left Harvard in the spring of his junior year to become clerk of a copper mine in Michigan. Two letters written home reveal his youthful ambition, disillusionment with business, and subsequent change of heart.

"I always was desirous of becoming a rich man and considered a business life best adapted to bring about this happy condition." But a few months later after a generous offer from Scott to finance his education: "I find that it will be much pleasanter to become a professional man and live moderately and free from care than to become rich and have my mind continually harassed with care and anxiety."

Six years later, after graduating from Harvard and Harvard Medical School, his ambition honed in on a philosophy which was to mark the remainder of his career. He wrote from Berlin, "If I cannot become an honorable practitioner, respected by my brethren in the profession, I will ask Frank [another brother] to give me a position on the wharf . . ."

He had already garnered the respect

(Continued on Page 7)

MGH News

Vol. 32 No. 3 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS April, 1973

Meeting the Demand for More Sophisticated Work

One Common Concern: A Child's Heart Surgery

Will my daughter experience much pain? Why does our son refuse to talk to us when we visit him? What can I do to prepare my child for his surgery? How will she behave when she returns home after hospitalization?

Questions like these and many others are aired each Friday afternoon on Burnham 6 – a pediatric floor in the MGH. Those participating share one common concern – children undergoing heart surgery.

Parents and relatives and a pediatric nurse and social worker gather each week to discuss the problems and anxieties associated with a child's future heart surgery. The benefits of fathers and mothers sharing their experiences and supporting other parents prior to their children's difficult surgery enable both adults and children to face the hospitalization with equanimity. When a father or mother is less anxious, the child's fears subside.

"Here is an opportunity that is being presented to parents before the fact of catheterization [a diagnostic procedure], operation, or hospitalization, as well as during hospitalization," Dr. Allan Goldblatt, pediatric cardiologist, said. "They can meet the people whom their child will work with and be cared for by, and the nursing staff and social worker can learn what concerns the parents may have, as well as learn more about the child."

Ruth Turner, RN, head nurse on Burnham 6 where the cardiac patients under age 9 are hospitalized, said, "About two years ago we had a general discussion group for parents of any child on Burnham 6. We noticed an increase in the number of children coming in for heart surgery, and the general group evolved into a meeting for families of children with cardiac disease either in the hospital for surgery or scheduled to come in."

Families have journeyed to the meeting from as far as Connecticut, Rhode Island, and western Massachusetts. Often only one parent will attend, either because of work responsibilities or because the spouse is too worried to discuss problems.

"We hope the other partner will come to a later meeting," said Barbara Richardson, a social-worker trainee member of the team, "so that we can help with his or her concerns." Very often the parent is more fearful of the

(Continued on Page 8)

Dr. Allan Goldblatt with friend

The first graduate of a unique program that will graft an M.D. degree onto a dental degree will complete his training in July.

Introduced quietly last summer at the MGH and Harvard Medical School, the training aims at turning out broadly based, top-flight oral surgeons capable of better treating the whole person. Dr. Walter C. Guralnick, Chairman of the Department of Oral Surgery at the Harvard School of Dental Medicine and Chief of Oral Surgery at the MGH, said:

"We're not trying to train some new breed of professional at all. We're trying to train the sort of competent oral surgeon that we have for some time, but we hope to improve the educational pattern of his program."

Conventional education for an oral surgeon entails four years at a dental school (after which the D.M.D. is awarded) and at least three years of postgraduate hospital training in oral surgery (for which there is no degree). The new program, tailored to graduates of the Harvard School of Dental Medicine, enables the oral-surgery trainee to obtain an M.D. degree after completing three years of a five-year prescribed program at the MGH.

The MGH also accepts graduates of other dental schools for three years of training in oral surgery.

In the experimental program two years out of five are spent in fulfilling requirements of the Harvard Medical School. The Harvard dental curriculum is one of only two in the country in which medical and dental students attend the same preclinical basic science

(Continued on Page 7)

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EDITORIAL:

On Recognizing the Hopeless and Hopeful

In this issue the *MGH News* includes some previously unpublished poetry. Written a half century ago by an MGH intern, the poems have stood a test of time: The complete collection of which these two form a part are as applicable to the medical scene in 1973 as in 1922 when they were written. All spin a fabric of life in a hospital and to varying degrees most imply principles as vibrant today as 50 years ago.

Of those selected here one describes an intern so driven by a desire to save life that he was unable to distinguish between the hopeless and the hopeful. The senior physician knew and wrote ". . . a completed process, make comfortable." Even so, the intern would not accept the words of experience. To keep the intern from repeating the error over a long career, the older physician permitted him to make various lifesaving attempts. Despite heroic measures, the patient died. And the older doctor drove home his lesson.

Fifty years later, a new breed of interns is undoubtedly more sophisticated. Yet some of the ethical questions evoked by the poem remain. In a hopeless case how long should life be preserved? The answer might prove somewhat easier if the word "hopeless" had a little more meaning. Every experienced doctor can probably recall a "hopeless" patient who walked out of a hospital. Therefore should a "dying" patient be treated as though he might survive in the hope that he will? The question prompts others. How is the doctor certain that the patient is dying? Is his opinion based on a few cases of his own or many thousands in the medical literature? How old is the patient? Twenty? Ninety? If he should somehow survive, will he be able to walk? Talk? Think? These are a few of the questions a physician must weigh when trying to help a family decide whether heroic measures are warranted. In some cases the weight of scientific evidence is reasonably clear. More often the guidelines available are scanty or nonextant. And often, despite the overwhelming burden of evidence, a patient's loved-one begs the doctor not to give up.

If anything, the issues today are much more complex than 50 years ago. The cost of keeping a patient needlessly alive can erase a family's savings. The bed that is occupied or the kidney dialysis machine that is used may be depriving someone else whose life can be saved. Is there any wonder that medicine is not an exact science; or that physicians turn prematurely gray?

Poems of an Intern

Sometime in the next two years Greer Williams, the author of The Plague Killers, *will have had published a biography of the late Dr. Clarence J. Gamble, a researcher in heart disease and later in fertility control. Dr. Gamble took his internship and residency at the MGH. In 1922 when he was completing the former, he wrote his mother:*

"These silhouettes were begun in days when I had to fill every spare cerebral minute with something other than patients and deaths and diseases. . . . There hasn't been time to force them through the hot presses of rhythm into the molds of rhyme, but I hope the pictures are there."

None of the 30 poems about people and events at the MGH has yet been published, but some will appear in the forthcoming biography. The MGH News *has selected two contrasting ones from Dr. Gamble's pen.* [Editor's Note.]

FRANK MILLS

As an interne he gave rich promise.
Clever, quick, an untiring worker,
With ready comprehension of the
fundamentals
That underlie disease,
And an everpresent ambition
To remove some ubiquitous malady
From the role of those
We know not how to cure.
In his year as resident,
He published a brilliant paper
That solved a long-disputed problem,
And suggested many others.
But he had a wealthy uncle
Who stepped in the path of a hurtling
taxicab
And left him a fortune.

WILLIAM JOHNSON

It is not an easy task to teach a man
The limits of his art.
Young Johnson, my interne, worried on
Over many a case long after we older
ones
Knew that the patient was doomed.
And by that worry lost much time
And energy which he might well have
spent

On those in whom the fight was still in doubt.
Reading his record of the tests
Made on a splendid college boy, I wrote
"Nephritis, a completed process, make comfortable."
But he could not accept the verdict.
"May I try
To bleed him and give salines, sir?" he said.
"Just as you wish." A week went by
And then he asked if I would mind
His giving diuretics and a diet
Low in nitrogenous foods.
"It will not change his downward course,
But go ahead." Another week impressed its dots
Upon his chart and still the boy grew worse.
His eyesight dimmed, his athlete frame
Was swollen with the dropsy, his head ached.
And still young Johnson fretted.
"Is there nothing more to do?" he asked one day,
"I cannot bear to let him go."
"Young man," I said, "On that first day
I wrote 'It's hopeless, make him comfortable,' but you
Would not believe, you cut his arm for bleeding
And parched his throat with thirst,
You purged and sweated him, gave many drugs,
And still before your eyes
Just as I said, he's dying.
I let you do it to teach you this lesson:
When the game is up admit it.
Work if you can with your head
But keep your heartstrings free.
Learn to face inevitable death
With calmness but with detachment
That you may work untrammeled
In the fields where your work will count."

* * *

Years passed, war came and he wrote me from France:
"Without your lesson I could not have lived
Through the days of red death and plague,
Seeing my comrades in arms
Slipping westward one after another,
Some slowly, some quickly, few in comfort.
But for you I could not have slept
While my sleep meant death to some
But greater steadiness of my knife
For the many others whose life depended upon it.
If each of the dying had taken with him
As much of my spirit and sympathy
As that patient of yours,
I should have died or gone stark mad
In the first short week of the drive.
God grant it may be seldom
But you and He have taught me how to write
'A finished process,
Make comfortable.' "

Cancer Research: Where It's At

Twenty-five years ago Dr. Paul Zamecnik, Director of the Huntington Laboratories, initiated what has been described as the modern approach to the manufacture or synthesis of proteins. With his associates he fused the sciences of biochemistry and cellular anatomy. Their studies revealed some new and fundamentally important findings. One was the establishment of a cell-free system in which to study protein synthesis so that the individual factors could be isolated and identified. This was followed by the recognition of the so-called adapter molecules involved in the "translation" of the genetic code. These basic investigations are now directly applicable to cancer research, and Dr. Zamecnik describes below the current state of cancer research both in general and in his own laboratories. The following is excerpted from his annual report which will be published this summer. [Editor's Note.]

The relationship of viruses to cancer continues to dominate thinking in the cancer research field. Each year brings more examples of malignant tumors in animals – from snakes to monkeys – which can unequivocally be demonstrated to be caused by viruses.

There are two classes of animal tumor viruses – those in which the genetic material is deoxyribonucleic acid (or DNA), as in the chromosomes of living cells; and those in which the viral genetic message is ribonucleic acid (or RNA), the material which carries the blueprint of the gene from the nucleus of the cell into the cytoplasm [the portion of the cell where the details of life processes are enacted]. In the cytoplasm this information is converted into protein molecules, which serve as the workers and traffic policemen in the economy of the cell.

In addition to providing information for the construction of new molecules and replacement of those worn out, the DNA of the cell is also the repository for regulatory messages which determine how rapidly or slowly the cells of an organ will grow, and in which of several possible activities it will engage. It is among these regulatory activities of DNA that sophisticated efforts are being directed in a number of laboratories to uncover defect(s) in restraint of growth which appear to be responsible for the overgrowth of tumor cells.

It is now established that the genetic information contained in the nucleic acid of an oncogenic [cancer-producing] virus is built into the chromosomal material of the host cell. In this position it can remain dormant for a long period of time, doing no harm. It can, however, be activated and become transcribed along with normal messages in the cell nucleus. All the information necessary to prescribe for a complete virus is available, and the oncogenic virus, once again formed *in toto,* may now begin to multiply. Events which accompany multiplication of the virus result in transformation of the host cell into a malignant cell.

The host cell also plays a role in the decision as to whether a virus with oncogenic potential will realize its malevolent possibilities. Recent work of Dr. Wallace P. Rowe at the National Institutes of Health indicates that at least two genes in a host strain of mouse determine whether a mouse leukemia virus will evoke leukemia or not.

In our laboratories an increasing amount of our total effort is being drawn into the field of oncogenic virology. Our special interest is in trying to explain in biochemical terms how a virus transforms a normal cell into a malignant one, a problem in which Drs. Mary L. Stephenson and Jessie F. Scott are particularly engaged.

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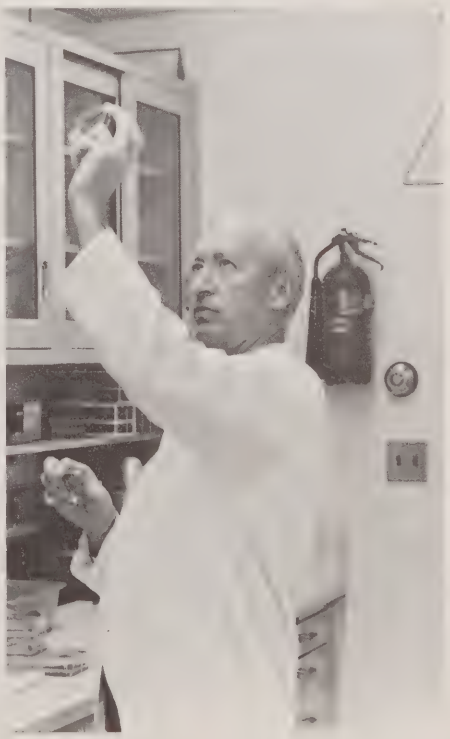


Dr. Paul C. Zamecnik

Attacking Old Problems With New Approach

A bold new approach to stagnating old problems is beginning to make inroads at the hospital's Medical Clinics.

The typical American hospital clinic conjures up images of long lines of patients waiting for physicians they have never seen and may never meet again. To the hospitals, outpatient departments mean a financial disaster.

In contrast the best of private doctors' offices paint a picture of a few patients comfortably reading while waiting to see "their" familiar doctor.

The problems: how to deliver a single standard of care to former private and clinic patients; how to make physicians happy while toiling in traditional American vineyards of doctor despair – the clinics; how to accomplish these changes without temporarily shutting down operations; and how to make the new system self-sufficient.

Together these may add up to a set of challenges never before undertaken simultaneously by a hospital outpatient department.

The proposed solution: a group of internists banding together to absorb gradually increasing numbers of the Medical Clinics population integrated with private patients. After nearly six months, they have begun to achieve their objectives.

Without a cent of federal funding which has nourished similar attempts in other hospitals; without halting or curtailing patient services in this transitional period – a single standard of care is being achieved. Yet at the first financial pulse-taking embracing the initial three months (Oct. 1 to Dec. 31, 1972), the new system, according to very preliminary Medical Clinics statistics, was operating without a loss.

"That's an extraordinary achievement in outpatient services, an area where hospitals have traditionally lost money," said Dr. Alexander Leaf, Chief of Medicine. "There has been a quiet revolution out there."

The reason for the subtlety of the change lies partly in numbers. To date only about one-fifth of the Medical Clinics patients are being involved.

About 60 percent are former clinic patients. The remaining 40 percent were private patients now integrated into the new system.

The long-range goal is to bring all the Medical Clinics patients – roughly a fourth of MGH outpatients – into the fold. The "quiet revolution" fulfills a promise by General Director Charles A. Sanders to put renewed emphasis on the general practitioner. In his annual report to be published this summer he writes:

"One of our great needs here at the MGH over the past several years has been to attract young physicians to practice internal medicine or deliver so-called primary care. In the age of great specialization, we have not encouraged the growth of the generalist as much as we should.

"Thus with the support of Drs. Daniel D. Federman, Alexander Leaf, John D. Stoeckle, and Benjamin Castleman, the Internal Medicine Associates has been established in the Medical Clinics for the purpose of developing a primary-care medical group."

Lying at the core of the new program, the Internal Medicine Associates is composed of internists who choose to deliver care as a cooperating group.

In July about four additional members will join the Associates, thus expanding the number of patients who can be cared for. With one exception all the Associates once saw their own patients in their private offices. Now these same persons come to the clinic area where the Associates work.

A few private patients have rebelled at the change. One woman refused to be examined there. It didn't matter to her that for many years the same doctor had treated her in that same office.

"Now it's a clinic," she huffed. However the feeling of the Associates is that most of their private patients have adjusted to the new system.

To the former clinic patient enrolled in the Associates, the biggest advantage to date is 24-hour coverage. As clinic patients, they were limited to a three-hour span each week during which they could telephone their physician with a problem. Under the new system they can call any time. Their own doctor or some other member of the Associates covering for him will respond.

Private patients covet this advantage. They also gain from the educational climate available to their doctor in a group setting. Those who had been clinic patients have a difficult time accepting or adjusting to this newfound right of 24-hour coverage.

"The former clinic patients still tend to think of the MGH as their physician," said Dr. James J. Dineen, Director of the Associates. "When one of them gets sick, he's still more apt to wander into the hospital rather than telephone the doctor who now acts as his private physician. Often the doctor who knows him may be able to solve the problem by telephone. If the patient has to come in, it is still quicker than seeing a clinic physician who never examined him before."

As the program evolves, the Associates plan to lay increased stress on educating their patients to telephone them. Such measures are made easier by the one patient-one doctor relationship. Having one physician on a continuing basis also stamps the program as a sharp break with the traditional American clinic facility as a part-time rather than full-time system of professional care.

Outpatient departments are habitually plagued by patients who fail to keep appointments. Already the percentage of patients failing to appear has fallen to half that experienced under the rest of the Medical Clinics system. No one is sure whether the advantages of the new system have led to the improved attendance rate.

"Whatever the cause," said Dr. John D. Stoeckle, Director of the Medical Clinics, "better attendance helps us in

Clockwise at weekly planning meeting of Internal Medicine Associates are Dr. Alexander Leaf, Ms. Donna Creamer, and Drs. Cyrus C. Hopkins, Lawrence C. Wood, James J. Dineen, and John D. Stoeckle.

our goal to provide efficient medical care for the public."

To promote improved efficiency, the Associates are represented on a newly created Board of Managers of the Medical Clinics. "In this way," Dr. Stoeckle said, "we're really redefining the clinic to give the physicians and the staff participation in the management issues which they've always had in individual practice."

The doctors thus decide when they require new personnel. Before, when the clinics needed additional nurses, secretaries, or clerks it was difficult enticing a hospital administration to pour tens of thousands of dollars into such needs when – like other hospital clinics all over the country – they were already losing money. The black ink on the first preliminary quarterly report provides the means to finance needed improvements.

The Associates – along with the rest of the Medical Clinics – achieved this unheard-of apparent solvency through a careful cost analysis. Before the launching of the program, Dr. Jerome Grossman, aided by others, worked out the organizational and financial details.

Lloyd L. Wilson, Medical Clinics Manager, and Miss Gayle Stone, accountant, scrutinized the costs. The two graduates of MIT's Sloan School of Management searched for precise ways to measure expenses.

From their data they were able to complete the task of providing a sound fiscal footing. This came at a time during which the hospital placed on a variable-fee basis the entire clinics system including the Medical Clinics and its Associates. Under this, patients pay charges based on the type and extent of services rendered them. This contrasts with the old inflexible rate which did not vary whether a patient spent five minutes or five hours in the doctor's office.

Its chief value lies in a system of fees that is considered more fair to the patients.

Since their income comes from sharing revenues, an understanding of outpatient economics makes IMA members more cost-conscious.

Nurse practitioners, trained to relieve the physician of the more routine medical responsibilities, also play an important role in the Associates.

"There are some great potentials for the expansion of a nurse-clinic practice in this kind of a setting," said Mrs. Sharon Follayttar, RN, Director of the Medical Clinics nursing staff. She said that the group practice lends itself to a nurse taking referrals from a limited number of physicians.

Nurse practitioners play an important role in the Internal Medicine Associates. Here Sharon Follayttar, RN, "examines" Nano Rush, an employee modeling as a patient.

"This would make a great difference in the kind of care that we are able to provide and the kind of communication that we could maintain between nurse and physician about particular patients."

The physicians themselves represent another variance from the usual hospital outpatient pattern. In most institutions doctors provide outpatient care as an obligation required for working in the hospital.

Regular members of the Associates have chosen their work.

"They're making a total commitment to the outpatient clinic on a level equivalent to the best private office medical practice," Dr. Dineen said.

Also expected to affect care are the expectations of the physicians for their patients. Mr. Wilson predicted that:

"When a doctor is set up full time in one location, he's going to demand that all his patients have the same atmosphere, the same reception, and the same pleasantness of experience he once asked for his own private patients."

Already the physical nature of the Medical Clinics is changing. Rank-and-file army-style chairs which once lined the waiting room have been grouped more informally.

Various shades of colors are brightening the once monotone beige. Curtains and rugs will decorate some of the Associates' offices.

The people who make some 55,000 annual visits to this Medical Clinics complex can be divided into three categories. Some are seeking immediate help for an episodic problem like stomach pain or upper respiratory infection.

They are not necessarily interested in developing a continuing relationship with the physician. A basically healthy person may just want to be healed and go on his way. About 15,000 patient visits a year fall into this category. At least part of their care is rendered in the Medical Clinics' Ambulatory Screening Clinic (*MGH News,* October 1970) which has extended its hours to include evenings.

A second category of patient is referred from other doctors, other clinics at the MGH, or other hospitals. The 10,000 or so annual visits referred this way generally need care provided by a section of the Medical Clinics dealing with a specialized problem such as diabetes.

A third group includes people who have no physician but want someone to assume responsibility for their health.

This is the category most likely to seek help from the Associates. In addition to offering acute care in time of illness, the program is expected to provide preventive care.

Like the rest of the clinics system, the Associates have a major problem that defies solution in the immediate future: lack of space. Other problems, however, are more amenable to solutions.

In various stages of study for all the Medical Clinics are computer information systems to provide data about pa-

(Concluded on Page 6)

A Change in the Medical Clinics

(Continued from Page 5)

tient medications, an automated patient scheduling system to improve scheduling efficiency, and financial data about physician fees and patient visits.

Already on microfilm is a weekly updated information list of all patients who have visited the Medical Clinics since April 1972.

These lists will facilitate follow-up contacts with patients. At some future point the Associates' patients requiring admission will probably have a special arrangement. This might assume the form of physicians taking turns caring for member inpatients.

"We would know," Dr. Dineen said, "that there's one Associate doc who is really keeping on top of all member patients, thus preserving continuity of care. We want to provide the best possible care to our patients whether they are seeing us in our offices, or we are seeing them in their hospital beds."

MANY HELP GROUP TO START

In its annual report to be published this summer the Board of Managers of the Medical Clinics credits a number of physicians with the establishment of group practice:

"Drs. Benjamin Castleman, Alexander Leaf, Daniel D. Federman, and Charles A. Sanders all pressed for and gave approval to a new organization that provides for a group practice. Dr. Jerome Grossman worked out the organizational and financial details of plans that had been discussed for several months by Drs. James Dineen, Cyrus Hopkins, Adolph Karchmer, and Lawrence Wood.

"After review and negotiations with Lawrence E. Martin and Dr. Federman, the planning document . . . prepared by Dr. Grossman was approved by Dr. Federman, Dr. Castleman, and the General Executive Committee."

Cancer Research: Where It's At

(Continued from Page 3)

We have selected the chicken leukemia virus (known as the avian myeloblastosis virus) as a model for study, since at the height of the disease there are one trillion virus particles per milliliter of chick plasma. It is known that the avian myeloblastosis virus, which kills chicks within 3 weeks of inoculation of the virus as a result of an overwhelming leukemia, contains ribonucleic acid (RNA) as a genetic material, and that this is the source of the malignant aberration the virus produces. The laboratories are involved in extensive studies to determine the chemical structure of this interesting nucleic acid molecule.

We are also involved in a study of the nature of Hodgkin's disease, a malignant disease of the lymphatic system in humans, which is suspected to be due to a virus and have begun to look for a virus in spleens removed from patients with Hodgkin's disease during the course of their evaluation for treatment. The tissue cultures from the Hodgkin's patients provide evidence – suggestive but not conclusive – for the presence of a human cancer virus.

Studies of our Clinical Oncology Group have centered on combination chemotherapy [drug treatment] for advanced tumors. It is their intent that such programs will be initiated earlier for those lesions having a poor prognosis [outlook] from the time of surgery.

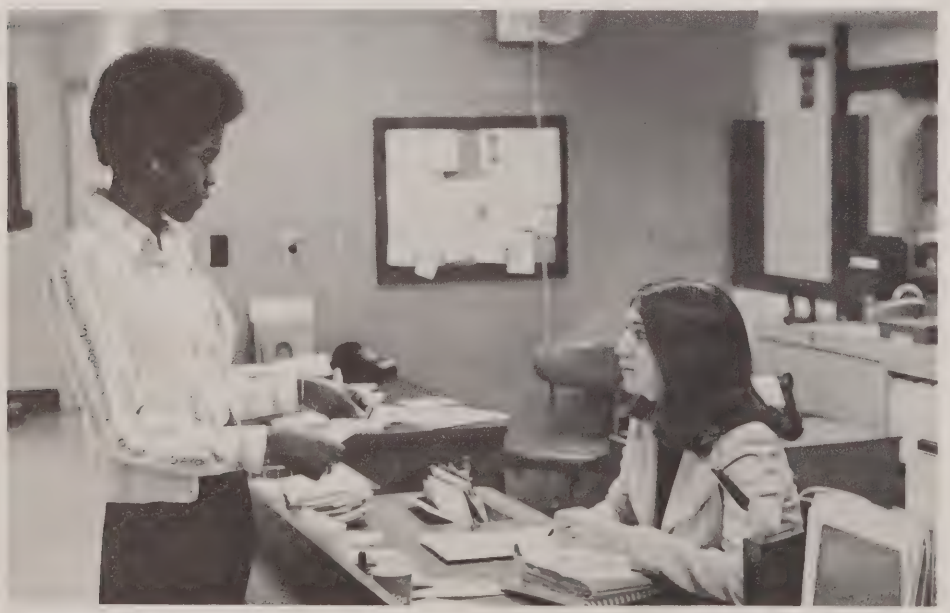
Dr. Lewis Engel and the Steroid Hormone Group in the laboratory are studying the molecular mechanisms by which these normal regulators of growth and differentiation interact with their target cells. In a similar vein, Dr. Nancy Bucher is investigating the way in which a rat is able to replace the loss after two-thirds of its liver is removed. This is a rapid regeneration of tissue, faster than that which occurs in tumor growth, and yet one which is under the normal control mechanisms of the animal.

Many years ago these laboratories were fortunate enough to open up a new field in biochemistry by discovering the pathways which lead to synthesis of protein. We still maintain an interest in this field which is central to problems of growth.

In this area, Drs. Irvin Hirshfield and David Coleman are dissecting out detailed mechanisms by which the amino acids [the building blocks of proteins] are activated and attached to the correct shuttle molecules (transfer RNA) which line up these amino acids in the correct sequence during the process of synthesizing a protein molecule. In this way the message of the gene is correctly translated into the structure of a protein molecule.

One of the leading hypotheses on the mechanism of aging is that errors creep into this process of translation, and eventually inferior enzyme molecules are synthesized, progressively incapable of carrying out the job required of them to keep the living machine functioning in top form.

Our present understanding of the mechanism of cancer formation is still expressed in the one-line poem of Robert Frost, "We dance round in a ring and suppose, but the secret sits in the middle and knows."



Patients being treated by the Internal Medicine Associates can complete enrollment at a single station. Ms. Jeannette McWilliams, secretary, seated, "takes information" from Mrs. Jackie Clinkscales, modeling as a patient.

Pilot Program Offers M.D. to Oral Surgeons

(Continued from Page 1)

courses during their first 18 months.

The M.D. degree is not an end in itself, Dr. Guralnick stresses. He believes many oral-surgery programs are deficient in medical and surgical experience. In order to correct this he proposed an additional year of general surgical training and a year of broad and varied exposure in medical and surgical areas at various Harvard teaching hospitals.

"The point I have tried to make," Dr. Guralnick said, "is that we [oral surgeons] have all had to gain additional surgical experience in various ways. Training programs presently depend upon surgical and other services to allow oral-surgical house officers to rotate through their services. Such informal arrangements are not good enough."

The specialty of oral surgery has advanced rapidly since the 1940s. What was considered a formidable procedure then is now handled competently by an intern. Oral surgeons handle complex fractures of the face, reconstructive jaw surgery, facial injuries, and tumors, as well as tooth extractions.

"Training changes as specialties evolve," said Dr. Guralnick. "This program is just in keeping with the educational process of meeting the demand for more sophisticated work. A case of a tumor of the jaw requiring extensive resection is no more difficult for a competent oral surgeon than extracting an impacted tooth, nor is it any more thrilling, and we should not lose sight of that."

The first D.M.D.-M.D. will finish his training this July. Dr. Steven M. Roser had already completed three years in oral surgery at the MGH and had returned to Harvard Medical School when the program was initiated. This year he is an Assistant Resident on the General Surgical Services and will have completed what is essentially the new program but in a different sequence.

He commented on the advantages inherent in such training: "You obtain a much broader clinical background in pre- and postoperative management of surgical patients. You can learn a variety of surgical skills, all of which go into making your own surgical technique.

"I think it will provide less of a barrier for oral surgeons in hospital medicine. With an M.D. an oral surgeon may be more acceptable to some hospital staffs and can be looked upon as an equal because he has the essential training."

With the knowledge and experience gained by the additional medical and surgical exposure required for the M.D. degree, an oral surgeon can treat the whole person with more confidence and skill. A different picture characterizes some institutions. Problems have existed for oral surgeons in some hospitals where the scope of their surgery, care of their patients, and even hospital privileges have been limited.

"I personally have never encountered those kinds of problems in any of our teaching hospitals," Dr. Guralnick said. "The climate for oral surgeons here is as congenial as anywhere in this country."

Dr. Bruce Donoff concurs. He has completed his training in oral surgery at the MGH and is currently at the Harvard Medical School for a year. "The learning atmosphere at the MGH is excellent," he said. "Oral surgeons there can take comprehensive care of their patients."

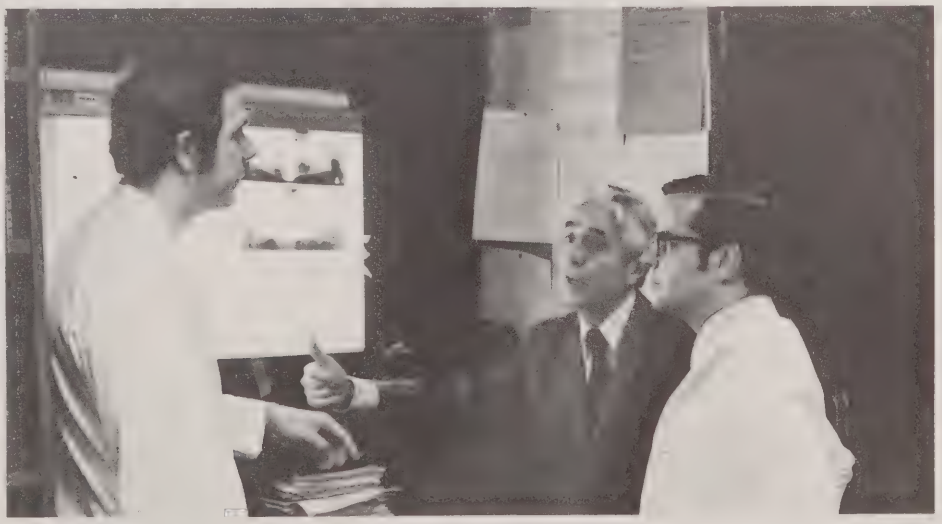
Dr. W. Gerald Austen, Chief of the MGH General Surgical Services, and other members of the Harvard General and Plastic Surgical Services support the program of additional surgical training for oral surgeons.

Some opposition to the expanded training has come, understandably, from within the specialty itself. Some feel that oral surgeons with combined D.M.D. and M.D. degrees will make the D.M.D.s obsolete. Others question the added time and expense involved in additional training. There is also the fear that oral surgery will become affiliated with medicine rather than dentistry.

"Not all institutions can presently develop such a program because not all dental students have preclinical training that is identical to that of their medical counterparts," Dr. Guralnick said. "The Harvard curriculum makes it possible for the experimental program to be completed in a minimum number of years. Other dental graduates would have to spend a somewhat longer period to attain the same ends." (The only other place in the country which awards a combined degree in oral surgery is the University of Nebraska, which uses a different approach.)

"I feel that we are answering the need for real quality in oral-surgical training," Dr. Guralnick continued. "If our experiment proves to be worthwhile, it will provide a blueprint for others to follow."

Dr. Edward Seldin (D.M.D.) in the operating room. He will receive his M.D. degree in June.



Dr. Walter C. Guralnick, Chief of Oral Surgery, center, discusses X rays with Dr. Steven M. Roser (M.D.-D.M.D.), left, and Dr. John P. Kelly (D.M.D.).

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One Common Concern: A Child's Heart Surgery

(Continued from Page 1)

surgery than the child. And the parents' and child's concerns may be very different.

Deborah Hill, a social worker who helped form the group, said, "The adults express fears about the admission and new procedures and how they can prepare their child for the experience. They see the diagnosis as life-threatening and may feel guilt for this." A child may view the separation from home as punishment or be concerned about who will feed a favorite pet while he is gone.

"Any kind of birth defect in a child increases parents' guilt," said Dr. Goldblatt. "What destroys us in life is not our tragedies but our guilt associated with them. Grief is not a destructive force. Guilt is. We can't change the fact that he has a birth defect. We *can* make sure he fulfills his full potential in life."

Dr. Goldblatt sends a notice of the weekly meetings to all parents whose children will undergo heart surgery, but their preparation and their child's begins long before.

"We begin teaching them about their child's condition from the day I first meet the child and his parents," said Dr. Goldblatt. Three main points are stressed.

"I tell them, 'Always treat the child as a whole human being and not just a diseased heart. Don't treat the child as an invalid.' I begin to educate them to the needs of the child in society. We focus on the fact that what this child has is correctable, as it is in the overwhelming majority of instances."

Questions often remain, however, that parents are reluctant to ask the physician. Fears of some of the difficult aspects of heart surgery such as risk and pain often don't come out until the meetings with other fathers and mothers, the nurse, and social worker. Sometimes a parent is too anxious to express himself then.

"The social-service worker can recognize and deal with a problem which might otherwise not be mentioned," said Miss Hill. "Since a child's adjustment often reflects the parents', it is important to get things more in focus. We can offer a parent individual help if we think he or she, and thus the child, will benefit."

Problems of common concern are encouraged at the meetings, but not questions specific to individual medical problems. Since each family's circumstances and child are unique, they are given reassurance about their own style of handling the hospitalization.

"They learn that each child is assigned one nurse who will be his primary nurse during his entire hospitalization," Mrs. Turner said. "Each of these nurses has a special interest in heart patients and will work with the child to explain the new procedures he will face."

Those attending the meetings are given a tour of the pediatric floor and are introduced to all the personnel who will work with their child.

Due to the success of the group at the MGH, the Boston chapter of the Massachusetts Heart Association has expressed an interest in expanding the idea into a group for parents of children with heart disease regardless of in which of three (MGH, Boston Floating, and Children's) area hospitals their children will undergo surgery. Dr. Goldblatt doubts this type of program can be duplicated on a comprehensive basis.

"Each hospital is different," he said. "The milieu on our pediatric floor is intimate because we are a small group and are very flexible. We have no visiting hours in pediatrics. If a parent wants to sit with his child at 3 A.M., it's O.K. I stress to them that we're not taking their child. It's their child, and this is the place where we will try to help him."

Ruth Turner, RN, demonstrates to parents the doll used in teaching pediatric cardiac patients about their upcoming surgery. Deborah Hill, far right, is a social-worker member of the weekly group.

MGH News

Vol. 32 No. 4 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS May, 1973

Saving Newborn Babies Thought Doomed to Die

Massachusetts Gears to Sober Up 65,000

Massachusetts has become one of the first states to abolish the crime of public drunkenness. In an attempt to predict what this change will mean in a state which has a severe alcoholism problem, the MGH News *has interviewed several experts.* [Editor's Note.]

When is a crime really an illness? When the crime is public inebriation. A law passed by the Massachusetts legislature nearly two years ago repealed public drunkenness as a criminal offense.

The first phase of that law went into effect last July when the state Division of Alcoholism began licensing throughout Massachusetts new detoxification facilities to care for the alcoholic patient.

The law will become fully effective on July 1. A policeman will then have three choices in dealing with a public drunk. He can take the person home; he can without booking him take him to the police station to dry out; or he can take him to one of the detoxification centers.

Mr. Jack O'Neill, spokesman for the Division of Alcoholism which is headed by Dr. Edward Blacker, said, "Massachusetts for at least the past ten years has averaged between 60,000 and 65,000 arrests for public drunkenness each year. [That average approximates the entire population of Medford.] The arrests for public drunkenness total more than all other reasons for arrests put together except for motor vehicle violations."

By July Mr. O'Neill estimates that nearly 300 beds for detoxification will be available, with another 200 yet to be established.

What the full impact of the law will mean to general hospitals such as the MGH is speculative, and opinions vary. But based on interviews with physicians in the MGH Alcohol Clinic and the Director of Social Service, the effect will probably not be severe.

Dr. John A. Renner, head of the Alcohol Clinic, said, "We have no way of estimating what the effects of the law will be, but we do anticipate an increased work load in both the Emergency Ward and the Alcohol Clinic."

Miss Eleanor Clark, Director of Social Service, does not think changing the law will make a big difference to the

(Continued on Page 6)

Miss Patricia Cerar, RN, gives artificial cough therapy to a tiny infant in Newborn Intensive Care Unit.

The Joseph S. Barr Pediatric Intensive Care Unit officially opened two years ago this month. In that time it has become the region's referral center for the most critically ill newborn babies.

These infants are so tiny and so sick that a short time ago most of them would have been considered doomed to die. Now an amazingly high percentage – apparently higher than ever before recorded anywhere – are surviving. The following articles look into some of the reasons and tell the story of this unit. [Editor's Note.]

At birth Martha weighed in at a sickly 3½ pounds. Respiratory distress syndrome (hyaline membrane disease) made her lungs collapse with each breath, preventing oxygen from getting into her blood and making her an unlikely candidate to survive.

Two hours after her birth at Emerson Hospital, Concord, her pediatrician telephoned the Newborn Intensive Care Unit at the MGH. An MGH resident grabbed a standby box of emergency drugs and some equipment. Armed with these and an incubator, he rode in a special commercially owned pediatric ambulance pioneered in this part of the country by the MGH.

At Emerson Hospital, he inserted a tube into Martha's windpipe, linking the infant to a respirator which took over her breathing and kept her alive during the return ambulance ride. Throughout that trip a cardiac monitor informed the resident about his tiny patient's heartbeat. A temperature monitor enabled him to observe changes in temperature. Cooling can be lethal.

(Continued on Page 2)

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EDITORIAL:

Alcoholism: A Change in Viewpoint

Our treatment of a disease is often related to society's perception of it. Once lepers were banished to islands where they were left to rot away under unbelievable "living" conditions. Mental patients were abandoned to institutions that kept them chained. Victims of strokes were relegated to lives of hopeless, neglected invalidism. Such examples of uncivilized attitudes do not all reside in the past. Our treatment of the alcoholic, for example, has retained a distinct barbaric flavor. On the one hand he remains the butt of jokes – even though his disease itself is not very funny. On the other he is sometimes subjected to abuse and often treated as a criminal.

Public attitudes toward illness have a way of rubbing off on the profession charged with treating disease. Like any citizen the physician brings his own family upbringing into his office. And although he strives to divorce his own attitudes from his professional behavior, he is a human, subject to all the frailties and vagaries of mankind. In 1965 the Alcohol Clinic of the MGH Department of Psychiatry published a study on whether the attitudes of a physician untrained in the care of alcoholics could stand in the way of a diagnosis of alcoholism in an urban hospital emergency-room setting. The study found that alcoholics in the most severe stages of their illness are diagnosed and referred for treatment. Those in the less severe stages are unlikely to be diagnosed.

Attitudes change slowly, but there is some evidence of society altering its opinion of alcoholism. For example, a Harris survey released last November found that by a 72-12 percent margin the people interviewed felt a person who drinks on the job should be helped rather than fired. By 65-26 percent they disagreed that people who are drunk in public but not causing trouble should be arrested. By 52-25 percent they rejected the idea of a policeman arresting drunks, suggesting that he take them to a hospital for treatment.

Now a state law that wipes out the crime of public drunkenness becomes fully effective on July 1. Reactions to this legislation are described in a page 1 article of this issue. The mere passage of such a law may in itself (without concerted effort by many people) do little to reduce the prevalence of alcoholism. But the mere fact that such a law was passed suggests how far we have advanced toward an enlightened attitude.

One of Her Lobes Began to Puff Up Like a Balloon

(Continued from Page 1)

At the newborn section of the MGH's Joseph S. Barr Pediatric Intensive Care Unit, Martha's respiratory distress syndrome gradually yielded to the ministrations of a team of expert doctors and nurses. Then, as so frequently happens to tiny babies with lung disease, she developed serious complications.

First, air began to fill the space (pleural cavity) between a lung and her chest wall. One of the ten physicians assigned to the unit inserted a surgical tube and applied continuous suction to remove the air. With constant attention the medical team controlled the life-threatening disease.

Then one of the lobes of her right lung began to inflate like a balloon, growing bigger and bigger until it started to push the rest of the lung out of the way. Thus at the time the ballooning lobe was on the one hand failing to do a good job of exchanging oxygen, it was on the other hand threatening the rest of the lung by collapsing it.

"We tried with various mechanical tricks to get it to deflate itself," recalled Dr. Daniel C. Shannon, Director of the Pediatric Intensive Care Unit. "However, it kept getting larger until it was now beginning to press on the heart and great vessels. Soon it was going to interfere with cardiac output [the heart's performance]."

A method developed by Dr. Shannon's group enabled them to examine her lungs safely and quickly. By the use of radioactive material called Xenon-133, they determined much more about the nature of her problem than available by any other means.

Used in infants only at the MGH thus far, this new method tells the doctors how one region of a child's lungs is functioning as compared to another. Martha's study suggested that surgical removal of the problem area would solve her unusual malady. The rest of the lung would then take over and work well for her.

Three days after surgery, she was able to breathe on her own and was taken off the respirator. On March 16, at age 89 days, she went home.

Throughout her hospitalization, her parents had visited her daily. Her mother would hold her hand and talk to

her. After work, her father would sit in a rocker and cradle his daughter in his arms while she was connected to all her tubes.

"I just think that kind of dedication will play a significant role in the child's future health," Dr. Shannon said.

Martha (her name, but none of the facts, has been changed here) continues to thrive at home, gaining weight. Her mother reports that she appears bright and alert.

Martha is one of about 300 extremely sick infants referred to the Newborn Intensive Care Unit since it opened in May of 1971. For the first few months the unit admitted only about one new infant every week.

Now that it has become a regional referral center, it had 72 patients referred to it last January alone – 24 more than could be cared for. The MGH suggested other institutions for the 24 babies.

Only the sickest of infants are accepted.

"The single most common kind of disease that makes either a newborn or a child critically ill is something affecting the respiratory [breathing] system," Dr. Shannon said. "That accounts for about two-thirds of the patients that we see."

About half of the remaining third have primarily some form of heart disease. Most of the remainder suffer principally from a neurologic problem.

Since their primary disease is so severe, it usually causes additional difficulties resulting from the close interaction of one body organ with another. Thus the baby with a respiratory disorder develops a secondary problem involving his heart. Those with primary heart disease often acquire a respiratory complication. Other organ systems may become similarly involved.

"When we finally have successfully overcome the complications that we can do something about," Dr. Shannon said, "I would guess that we are going to be left with about 10 or 15 percent of the babies that we can do nothing about; whose cause of death is often intracerebral bleeding [bleeding in a portion of the brain] that probably occurs sometime either during or immediately after birth. That would be prior to the time that they reach here. Some feel that nearly all such babies develop brain damage.

"Fortunately for the parents as well as for the baby and ourselves, the intracerebral bleeding is recognizable within about the first 48 hours of life. Thus there is no prolonging of a hopeless situation."

Dr. I. David Todres, an Associate Director, entering Newborn Intensive Care Unit

Nurses in foreground tend to newborns as physicians discuss care of one of their little patients.

At any one time as many as 9 of 12 newborns in the unit need to be on a respirator. Like Martha, the average newborn there has a birth weight of only a little over three pounds.

The unit has done so well with these children that the team now treats very sick infants who weigh less than 1,200 grams (about 2⅝ pounds).

Because they are so small, their requirements differ from even three-pound babies. Despite the combination of critical illness and very light weight, these newborns seem to be doing well.

It is too early to provide definite information, but preliminary indications are that a high percentage are saved.

"To give you an idea," Dr. Shannon said, "the published figures for mortality of any infant whose birth weight is 1,000 grams [about 2¼ pounds] and under are 90 percent. This means that nine out of ten babies born weighing that little die whether they are sick or not.

"Since we started to save these tiny babies who are in addition very sick, considerably less than 10 percent are dying."

One of these ill newborns who survived after a month on a respirator weighed only about 1¾ pounds at birth. Like all these children he required constant attention. He is now developing like a normal newborn.

"The newborn with severe respiratory disease," Dr. Shannon said, "has a survival chance here of 73 percent according to last year's figures. That's about 20 percent better than any published figures from anywhere else for that kind of problem."

(Concluded on Page 4)

Aiming Far Beyond Survival

(Concluded from Page 3)

With all the round-the-clock intensive care that a team of specialists must devote to each infant, the costs run very high – $300 a day. This kind of expense has made the unit extremely careful to restrict the care to only the sickest newborns struggling for life.

Once a baby recovers from his acute illness, he is – whenever possible – sent back to his hospital of origin or a non-intensive care unit at the MGH.

"We start arranging the transfer to the original hospital," said Dr. I. David Todres, one of the unit's Associate Directors, "as soon as the baby appears to be within a day or two of recuperating from his acute illness."

The resultant contact with the community doctor before and after the MGH hospitalization has increased his role in his tiny patient's care. The MGH resident's contact with the parents at the time of original transportation often personalizes the care for them. When the parents telephone or visit, they generally ask for the traveling resident they met in the community hospital.

Whenever practical, visiting parents are encouraged to touch and talk to their babies – much the same as Martha's parents did. Studies suggest that infants emotionally need human contact. Thus the theory is that this kind of stimulation may prove important to their well-being after they recover.

Miss Marsha McAuliffe, RN, feeds recovering newborn whose face barely peeps out of her swaddling clothes.

The unit members emphasize they are striving to achieve much more than mere survival. They want the recovering infants to lead normal lives.

To evaluate their success, the unit has established Project Comprehensive Care. Every other Monday four babies return to a follow-up clinic organized by Dr. Fergus Moylan. A battery of medical and allied medicine specialists evaluates their progress.

Dr. Shannon stressed that it is too early for more than a very preliminary judgment.

"But so far," he said, "the neurologic assessment has been extremely good – essentially comparable to their biologic age regardless of whether they happen to have weighed only 1,000 grams when they were born.

"The longest follow-up is about 2½ years old, and it's going to take at least several more years to begin to make definitive statements. Although it's a subjective comment, the mother of the 2½ year old believes the child is brighter and more active than her other two children who had normal birth histories."

Each child who had respiratory care in the unit receives the daylong follow-up evaluations twice a year. Their community pediatrician provides the rest of their follow-up care.

A side benefit of these every-other-week sessions accrues to the nurses and physicians themselves.

"Seeing these once ill youngsters return," one doctor said, "encourages the doctors and nurses who are now caring for similar infants."

Three Parts to Pediatric I.C.U.

The Joseph S. Barr Pediatric Intensive Care Unit is divided into three general sections within the Children's Service.

The newborn unit described in the page 1 article contains 12 beds. Another unit has seven intensive-care and eight intermediate-care beds for children up to 18 years of age.

Intermediate care is for those patients requiring more than ordinary attention for a disease that is less than life-threatening to them. The nurse-patient ratio for those beds is about one to four as compared to one nurse caring for less than two babies in intensive care.

Saving More Babies: Some Likely Reasons

The unusually high survival rate achieved thus far in the Newborn Intensive Care Unit (page 1 article) may result from a combination of factors.

Both Dr. Daniel C. Shannon, Director, and Dr. I. David Todres, Associate Director, specialize in the most common problem seen there, respiratory disease, and Dr. John T. Herrin, Associate Director, specializes in kidney and metabolic problems.

Another factor seems to be the way the unit treats pneumothorax, the name for the condition Martha experienced when air developed between her lung and chest wall. The unit discovered that tubes physicians are trained to use to let the air escape fail to drain it off as fast as new air forms. This dangerous condition of pneumothorax demands a larger tube conventionally used by surgeons.

Because the condition can develop in seconds, there is little time to wait for a surgeon who may be in the operating room. Members of the Newborn Unit are therefore trained to use the larger tubes.

The establishing of this policy has prevented any babies from dying of this life-threatening problem.

Expertise gained by the interns and residents who help staff the unit is believed a factor in the surprising survival record. These house officers provide a backup to staff physicians.

Because of the many complications the newborns are subject to, it is considered advantageous that experts in a variety of specialties are assigned to the unit. Among them are Dr. Herrin in kidney disease, Dr. Allan Goldblatt, who provides expertise in cardiac problems, and Drs. Gwen R. Hogan and G. Robert DeLong, who are pediatric neurologists.

Linda (not her real name) is a case in point. At birth she weighed about 2½ pounds. The MGH resident who brought her by ambulance from another hospital inserted a tube to enable her to breathe during the trip.

When she arrived, a surgeon realized that an abnormal passage affecting her trachea (windpipe) and esophagus (passage leading to the stomach) needed immediate attention. He repaired the condition in the operating room.

After the operation, the surgeons

SOMETIMES BY AIR

Coast Guard helicopter brings infant and an MGH resident. (*Boston Globe* photograph)

Unit Named for Noted Surgeon

The Joseph S. Barr Pediatric Intensive Care Unit was named after the Chief of the MGH Orthopedic Service who died in 1964.

A grant from the Peabody Home for Crippled Children established the unit in Dr. Barr's memory. Dr. Barr was Medical Chief of that home which he had served since his graduation from Harvard Medical School.

He was John B. and Buckminster Brown Professor of Orthopedic Surgery at the Medical School. Dr. Barr was the first to recognize that the major cause of back pain and sciatica involved the intervertebral disc. He was regarded as an excellent surgeon, a superb clinician, and a devoted teacher.

Special studies of children's diseases are being carried out in the unit with a fund established by parents and friends of patients and former patients.

cared for the surgical aspects, and the physicians took care of the respiratory and pediatric ones. The pediatric heart specialist attended to a problem (congestive heart failure) arising from a heart defect with which she was born.

The heart defect eventually closed by itself and will require no surgery. Linda has gained about half again her birth weight. Off the respirator, she is feeding well by mouth.

Backing up the 10 physicians and 20 nurses who treat babies like Martha and Linda, the unit has acquired a medical engineer and a respiratory therapist. To solve each patient's problems and to consider the impact of this illness on him and his family, doctors conduct daily rounds with nurses, a social worker, pharmacist, technician, therapist, and engineer.

Speed is still another vital factor in saving the lives of so many of the newborns.

"One of the things that we recognized early," Dr. Shannon said, "was that the sooner we could get either an infant or a child who required intensive care, the better his outcome would be. That's particularly true in the area of the newborn."

Doctors assigned to the unit were thus able to provide referring physicians in other hospitals with specific guidelines: Nine of ten newborns developing symptoms of respiratory distress within the first four hours of life would have to be put on a respirator.

Certain combinations of events make it possible to predict even before birth that the infant will almost surely require immediate care on a respirator. Accomplishing this quickly is often lifesaving.

Some 15 of the infants have arrived in a Coast Guard helicopter bearing an MGH resident and incubator. Most of the others came in a special private ambulance almost always accompanied by an MGH resident with an incubator.

The Coast Guard helicopter managed to pick up one desperately ill baby in a hospital 60 miles from Boston just a half hour after birth.

Not content to stand by, some of the local physicians have even gone a step further. One doctor, for example, volunteered to help the MGH resident. The community physician scampered aboard the helicopter with the resident and the baby in Laconia, N.H. When he felt that the baby was sufficiently stabilized at the MGH, he boarded a bus back to Laconia. Another physician from the Cape Cod Hospital came directly with his sick infant by helicopter, thus saving precious time.

"It's very encouraging to see that the physicians in the community take such a degree of interest," Dr. Shannon said. "We've had requests now from a number of them who would like to

(Concluded on Page 6)

SOMETIMES BY LAND

A special ambulance brings newborns to the MGH. Whether transported by helicopter or ambulance, the infant is customarily accompanied by an MGH resident who provides care necessary to keep the infant alive en route. Here an incubator bearing a newborn is wheeled from the ambulance down a hospital corridor.

Some Likely Reasons

(Concluded from Page 5)

spend a week or so to learn more about what is going on here and what some of the things are they can do to prepare the infant for a safe journey." This program should provide even better care.

The special transportation efforts began because MGH pediatricians realized that a large number of infants requiring special care were dying in standard ambulances on the way to the hospital. At the same time many newborns were not being referred at first because the doctor feared they would die on the road or that nothing could be done even if they did reach the MGH alive.

Of the last 15 babies transported in the conventional manner in 1971, 12 died en route. All 18 transported by special ambulance and/or helicopter service at that same time survived.

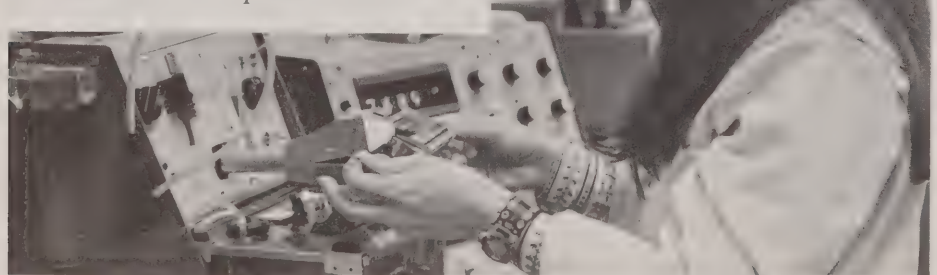
As a result the pediatricians here are extremely reluctant to allow a newborn to be transported in a conventionally equipped ambulance without a physician along to sustain the infant.

Testing With Micro Amounts

The low birth weight of most very sick newborns presents special problems even for testing.

Doctors need a variety of tests on critically ill infants. To get enough blood for just one battery of tests necessitates seven percent of a 2½-pound baby's entire blood volume. Since such tests are needed as often as every hour, they could deplete his total blood supply in less than a day.

Therefore the Joseph S. Barr Pediatric Intensive Care Unit has a built-in microchemistry laboratory that performs the same tests with about one-tenth the amount of blood required by the adult Chemistry Laboratory and the Blood Gas Laboratory. Special machines and technicians trained to use them make this possible.



Miss Susan De Prima, a Microchemistry Laboratory technician, places capillary tube in blood gas analyzer which needs only micro samples from an infant to measure the gases in his blood.

Dr. John A. Renner, head of the Alcohol Clinic, discusses possible impact of new law with Dr. Eleanor Hanna, center, and Miss Barbara Eddy, Clinical Assistant.

Sobering Statistics: Boston Ranks Second

(Continued from Page 1)

MGH, but with reservations.

She said, "In the Boston area by July 1, in all probability we will have enough detoxification beds operational. However, if Boston City Hospital which admits a large number of patients with alcoholism problems cuts back its capacity and the Long Island Hospital with a 125-bed capacity for patients with alcoholism is closed, then the detoxification facility beds in the community will not be adequate to the need, and we will feel quite a crunch in the Emergency Ward."

With an already heavily burdened Emergency Ward and near-capacity bed occupancy within the hospital, additional patients with alcoholic problems would squeeze overtaxed facilities.

"However, I don't think the police will overburden the emergency wards," Miss Clark said. "They will probably without making an official arrest use the option of taking to the police station the patients for whom detoxification beds are not available."

Massachusetts is one of a handful of states which have abolished the crime of public drunkenness. It is also, with a population of 300,000 alcoholics, the fourth highest in the nation in alcoholics per capita. Boston ranks second among major U.S. cities. Widespread publicity on other drug abuse notwithstanding, alcohol remains the more serious problem in all age groups.

Dr. Charles S. Mullin, a psychiatrist associated with the MGH Alcohol Clinic, stated that statistics from the American Hospital Association indicated that anywhere from 10 to 30 percent of general hospital inpatients have an alcohol problem.

"A great many patients who have medical and surgical difficulties related to abuse of alcohol," he said, "are not even recognized as having an alcoholic problem related to their symptoms, or if there is some recognition, not much may be done about it. The injury proneness and the illnesses for which they are admitted continue after discharge; readmissions are commonplace, and the costs must be enormous."

A poor image may also affect the way physicians tend to handle the problem drinker. Dr. Renner said, "Anyone who comes in to a hospital's emergency ward looking dirty and disheveled and drunk is less likely to get a sympathetic

hearing from the average physician. There's no question that the physical appearance of the alcoholic has a lot to do with whether the physician will see the patient as motivated to change or ready to use help.

"If the patient looks attractive and is still working to support himself, he or she may well be regarded as someone who could use therapy and could be helped, but the alcohol problem may be minimized."

The repeal of the public drunkenness law alone would probably affect only the small percentage of alcoholics in the state who are the unemployed "Skid Row" type. But with the availability of community-based detoxification centers for drying out and rehabilitation services emphasizing preventive action, this statewide program can reach problem drinkers on all economic and social levels.

"Treating the alcoholic patient can be a very frustrating process," said Dr. Renner. "The staff sees 'Freddie' every week. One of the reasons he may keep coming back is that we haven't had adequate detox facilities, or we haven't had halfway houses. Now that the state has a better treatment system, maybe he will do better."

Physicians in the Alcohol Clinic are currently working with the state Division of Alcoholism to place MGH Emergency Room nurses in a training program for RNs and LPNs. They will attend the course at the Lemuel Shattuck Hospital to increase their competence in dealing with alcoholic patients in emergency room settings.

Whether in the words of Dr. Mullin the new law will promote "the inevitable reduction of the incidence of alcohol abuse and all its attendant evils, producing incalculable economic benefits, not to mention the mitigation of a prime source of human misery and degradation" remains to be seen. But it does provide the alcoholic patient with an opportunity for comprehensive treatment and possible cure and a chance to live without the crutch of alcohol.

Miss Janet Cannon, secretary in the Alcohol Clinic, confers on patient scheduling with Drs. Charles S. Mullin, center, and John A. Renner.

Dr. Francis Rackemann Founded Allergy Clinic

(Concluded from Page 8)

When the crowd is noisy enough, conversation becomes private."

In the early thirties he founded the "Massachusetts General Hospital Wheeze, Sneeze, and Itch Society" with other members of the Allergy Clinic staff. It was a forerunner of the New England Allergy Society.

His longtime associate, Dr. Walter S. Burrage, remarked on Dr. Rackemann's deep interest in his patients, even to the extent of going into their homes to search for the causes of their allergies.

Another colleague, Dr. James M. Faulkner, recalled that he had taken at intervals during treatment pictures of his asthmatic patients and himself. Often patients would delight in sending him photographs at Christmastime to add to his files. His office records, written in longhand, were notable for their accuracy and completeness.

A prolific author of over 175 scientific papers, he also wrote two books: *Clinical Allergy* and *The Inquisitive Physician,* a biography of his cousin and fellow MGHer Dr. George Richards Minot, who won the Nobel Prize for research in and treatment of pernicious anemia.

Dr. Rackemann is remembered with great esteem and uncommon affection. His contemporary, Dr. Paul Dudley White, said, "Of course he contributed much to scientific medicine and was a leader in his field. But most of all one remembers his pleasant personality and his great kindness."

That kindness continually shines through in anecdotes about the man. One colleague recalled that while waiting in the 263 Beacon St. office he had seen Dr. Rackemann with one of his patients, a poor woman from a Maine fishing village. A proud Yankee, she insisted on paying for his services then and there, and offered him payment in worn dollar bills.

Not wanting to offend her pride, but realizing she could ill afford to part with her hard-earned money, he took another tack. Bending over, he removed a shoe, exposing a hole in the toe of one sock.

"You can pay me," he said, "but I would far prefer if you would knit me a pair of socks, which you can plainly see I need."

Dr. Gordon Donaldson, who valued highly "his friendship, simplicity, and optimism," said, "In his heyday Dr. Rack was the whole physician, balancing his scientific know-how with a gentle humaneness which is difficult to duplicate today."

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Scientific Know-how, Gentle Humaneness

At the end of a busy day when most men would be happy to sink into a comfortable chair, this man would head for the Union Boat Club, fold his 6′2″ frame into a single shell, and scull up the Charles River. A pioneer in the treatment of hay fever and asthma and a world-renowned authority on allergies, Dr. Francis Minot Rackemann could circumnavigate in his shell the area where he spent all but a few years of his professional life.

He rowed on the Charles River until he was 75 and saw patients into his eighty-fourth year. Only the week before his death in March at the age of 85, he learned that the American Academy of Allergy had established the Francis Minot Rackemann Lectureship to honor him as "a teacher, investigator, practitioner, and most important, as an individual."

In addition, he had been an officer and member of countless medical societies and had received honors and recognition for his work from many foreign countries. He had been president of the American Society for the Study of Asthma and Allied Conditions, the American Association for the Study of Allergy, the American Clinical and Climatological Association, the New England Society of Allergy, and the Massachusetts Medical Benevolent Society.

He was a member of the American College of Physicians, the Association of American Physicians, and the American Academy of Arts and Sciences. He held honorary memberships in the French, British, Canadian, Dutch, Italian, Spanish, Scandinavian, Danish, and Argentinian allergy societies.

The French government presented him with its Medal of Public Health in 1952 for "his outstanding work in the field of allergy."

Dr. Rackemann, a native of Milton, graduated *cum laude* from Harvard (1909) and Harvard Medical School (1912). His skill in rowing earned him a place on the crew in undergraduate school, where he also took a hand at composing the score for the Owl Club song. Music (he played the piano) and rowing remained lifelong interests.

A dry, subtle sense of humor and the ability to "make order out of chaos" with cool equanimity are reflected in one passage of "Allergy in Europe," an article he wrote for the MGH newspaper in 1956.

"My attempt to read a paper 'en Francais' to La Societe Francaise d' Allergie was not good. My pronunciation was atrocious, and Professor Pasteur Vallery-Radot said to me, 'When you talk to the students tomorrow, you had better talk in English.' When – I – talked – very – slowly – they – seemed – to – understand – and – gave – me – a – hand."

Dr. Francis Minot Rackemann

The year young Dr. Rackemann applied for a house-officer position at the MGH, intern examinations were conducted in the office of Dr. Herman Vickery at 263 Beacon St. After Dr. Rackemann was married in 1917, that same house – a wedding present – became both his home and office.

One admiring colleague described the first floor office: "The heavy paneling, massive central desk, shelves on shelves of books, and rows of medicine bottles were typical of the consulting room of an earlier era. He refused rides and in true form excused our need to ride because our offices were three doors further west than his own from the hospital."

After two years as a Medical House Officer at the MGH, he spent another two years at the Presbyterian Hospital in New York on research on anaphylaxis (hypersensitivity to a substance which causes a reaction in the body). In 1916 he returned to the MGH and began to study patients with asthma in the Medical Outpatient Department.

World War I intervened, and he served as a First Lieutenant in the Army Medical Corps. After the war, in July 1919, Dr. Rackemann took over the newly formed Allergy Clinic, an association which lasted until his retirement in 1948 as Physician at the MGH. As Dr. Nathaniel W. Faxon, late General Director and historian of the MGH, wrote, "To most people of this area, the name of Dr. Francis M. Rackemann and the MGH Allergy Clinic are connected much like 'beans and brown bread.'"

The Clinic's Chief dryly commented on new quarters in the Clinics Building into which the Allergy Clinic moved in 1927: "The place seems small, particularly on hot days in summer, but the doctors do well in it.

(Concluded on Page 7)

MGH News

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Feeding Technique Saves More and More People

A Question for the Senator

On April 25, Massachusetts Senator Edward M. Kennedy's Subcommittee on Health conducted a hearing at the MGH on the health budget reductions proposed in Washington.

A number of witnesses testified against the proposals. In his first appearance before the subcommittee, Dr. Charles C. Edwards, new Assistant Secretary of Health, Education, and Welfare, defended the Administration budget.

Dr. William F. Maloney of Tufts Medical School, representing the deans of the four Massachusetts medical schools, mentioned the deleterious effects the proposal would have on health care. Dr. Irene Palmer, Dean of the Boston University School of Nursing, described the adverse results on nursing schools. Representatives of neighborhood health centers and other groups also spoke out against the reductions.

In the MGH's 162-year history, it is believed that no Senate subcommittee hearing had ever before been held here. Outlining some of the effects the budget cuts would have on hospitals like the MGH was Dr. Charles A. Sanders, General Director. His testimony follows:

The issue of government cutbacks is one of grave concern. I would like briefly to deal with the projected phasing out of the clinical and research training grants. These grants have been described as being misused and abused; a means by which the public subsidizes education of physicians who go out and get rich. I should like to answer these criticisms and point out the many positive features of the training grant program. I would be the first to agree that periodic review always is a wise course. But action undertaken without careful study is folly.

The long-range effect of cutting important programs could be calamitous to the country. Men and women trained under this program become the teachers and researchers of tomorrow. At the Massachusetts General Hospital, for example, more than 80 percent of our clinical and research fellows have gone on to teach future generations of physicians and perform research in addition to caring for patients. Many of these graduates head departments in medical

(Continued on Page 5)

Inserting tube through which patient is fed. After patient receives a local anesthesia, tube is inserted in large vein under collarbone.

A new technique for feeding seriously ill people is saving the lives of a rapidly increasing number of patients.

Analogous to an artificial kidney, the technique, sometimes called "hyperalimentation," provides food for patients during periods when they cannot eat in the normal way.

Some doctors regard it as one of the two or three leading advances of the past decade. But as yet comparatively few hospitals use it.

The MGH made 64 percent more use of it last year than the entire city of New York – more than twice as much as the state of Hawaii. At the same time the MGH has found new uses while cautioning that there are potential serious risks.

Developed by Dr. Stanley J. Dudrick, then of the University of Pennsylvania, it is mechanically a familiar procedure. It consists of a tube (catheter) inserted in the major vein under the patient's collarbone. Except for the location, it resembles standard intravenous (IV) feeding.

What marks the contrast to the old IV is the content of the solution. And the content depends on a revolutionary if simple concept.

"For some strange reason," Dr. Josef E. Fischer said, "the overall effects of starvation had not been understood. In the past decades after we had caught up with a lot of other problems, many patients still ended up dying of starvation."

Dr. Fischer, who heads the hospital's Hyperalimentation Unit where the new work is supervised, gave the example of a patient with a breathing

(Continued on Page 2)

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EDITORIALS:

A Major Role Behind the Scene

The news of Dr. Ellsworth T. Neumann moving to The Rockefeller Foundation will not startle many nonhospital people, because he shunned publicity. During his 24 years at the MGH, he has always toiled quietly. Among those who have worked closely with him, however, his loss will be deeply felt.

Behind the stage Dr. Neumann has often played a major role. Many of the hospital's achievements over the past two decades or more have resulted from his direct or indirect influence. In rejoining Dr. John H. Knowles, former MGH General Director who now leads The Rockefeller Foundation, Dr. Neumann will undoubtedly continue his accustomed role as adviser and executive. The hospital hopes that his influence on the Foundation will bear as much fruit there as his counsel has for the MGH.

Revising Some Old Medical "Facts"

Like many other new projects, the one involving feeding a full meal to a patient by vein has been misnamed. Most physicians began by calling the procedure hyperalimentation. At the MGH the office supervising the exciting development is called the Hyperalimentation Unit. From its Latin origin the word "hyperaliment" means to provide more nourishment than ordinarily required. Some patients – those suffering from severe burns, for example – do need and receive more calories than normal. For them the process is truly hyperalimentation. Most of the people being treated are given normal amounts of calories, sugar, vitamins, and chemicals called electrolytes in their solution. It makes more sense to call the feeding "total parenteral nutrition." Yet like a nickname, incorrect terms often stick. Since "hyperalimentation" is easier to remember than "total parenteral nutrition," the one-word designation will probably persist.

More important than the terminology is what the treatment does. It is not a panacea. It does bear with it potential complications. Nevertheless total parenteral nutrition does seem to have proved itself as an adjunct to treatment or even as a primary treatment for certain problems. It also shows promise in other areas that are still experimental. As one surgeon notes, "It really changes the rules of the ballgame. More important, people survive now who five years ago would not have."

Patients Quickly Start To Regain Weight

(Continued from Page 1)

difficulty. By being put on a respirator which takes over his breathing, the patient frequently can overcome this disorder.

While on the device, he often cannot eat. Instead he is fed through a tube which carries nourishment into his vein. This IV solution traditionally contains some form of sugar (dextrose or glucose) and water or salt water, only 450 to 600 calories daily.

To replace constantly dying tissue, however, the body requires protein. Many illnesses demand abnormal amounts. Built-up supplies of fat substitute for a while. After the fat reserve depletes, the patient starts living off his muscle mass. Loss of muscle in turn, it is believed, could make him so weak he cannot breathe without the respirator.

What Dr. Dudrick (now of the University of Texas) accomplished was to figure out how much of nature's building blocks called amino acids must be added to the old IV sugar solution and to devise a safe way of administration.

The body normally uses a form of sugar in order to help the amino acids make protein to build new tissue. Dr. Dudrick's breakthrough came when he discovered that man needs a certain ratio of calories to a gram of nitrogen, an element contained in the amino acids. With the correct mixture the artificial solution flowing into the vein works the way food does when swallowed. Eventually the substance reaches the bloodstream.

The sugar in the standard IV solution acts like a candy bar that provides a brief burst of energy. With amino acids to make protein, the new solution in effect adds meat to the food. As far as basic body-building requirements go, the meal is now more complete!

Since the diet is better balanced and the nutritional feeding is entirely by vein, it is called total parenteral nutrition. (Parenteral means a route other than the intestinal tract.) By not using the stomach and intestines and delivering the nutrients directly into the bloodstream, the IV tube becomes a kind of artificial intestine. Or it can be likened to a heart-lung machine which bypasses the heart and lungs during open-heart surgery.

Patients fed with this new solution quickly started to gain back the weight they had lost through illness.

"Dudrick was thinking specifically of the patient who was a gastrointestinal cripple," Dr. Fischer said. "Someone who could not eat. Most of these patients had fistulas of some sort [abnormal connections between the bowel and skin].

"Then Dr. Dudrick went on to a modification of the solution for patients with renal [kidney] failure. The emphasis there was on feeding patients who happened to have renal failure at the same time that they were unable to get enough nutrition orally.

"At the MGH I think there has been a great deal of emphasis on branching out – on using this kind of nutrition in a variety of ways." As a result from 20 to 45 patients in the hospital on any one day receive this treatment.

With persons who have kidney failure, the MGH has carried the idea beyond providing nutritional support to a patient unable to eat. The belief of Hyperalimentation Unit physicians is that the proper diet actually enhances recovery from kidney failure.

A project directed by Dr. Ronald M. Abel, Surgical Resident, showed 75 percent of the studied patients treated this way recovered from their episode of kidney failure. Only 45 percent of those receiving the best previous IV solution (hypertonic glucose) recovered. Studies conducted by other hospitals had shown far fewer patients had survived with conventional treatment for acute kidney failure.

With about 300 such patients given this new kind of care, the MGH has probably accumulated the world's largest experience. The solution used for this group of patients is still limited to investigational purposes. Acute kidney failure is not the only pioneering effort the hospital has made with the new technique. Dr. Fischer has done some of the original treatment successfully using the method for patients with inflammatory bowel disease.

The remaining uses for which the MGH employs the treatment represent standard ones. About one in four of its patients have an abnormal passageway from some part of their gastrointestinal (GI) tract to their skin.

Others are treated for a wide variety of conditions. The largest group of patients receive the nutrition as a supportive technique to avoid the complication of starvation. For the smaller group – like those with abnormal openings from their GI tracts – bowel rest and nutrition turn out to be a primary form of treatment.

Among the various conditions helped are severe burns. Patients with burns covering 60 percent of their bodies have proved to be good candidates.

"Burn patients," Dr. Abel said, "literally eat themselves up and then die. They have to produce 10,000 calories' worth of energy a day [to replenish the body heat lost through open skin]. It doesn't take too long to use up all the available fat storage in your body."

The total parenteral nutrition helps provide the needed calories. As a result severely burned patients have a better chance to survive.

As with acute kidney failure, survival rates seem to be improving in other diseases treated this way. One example is patients with abnormal openings from intestine to skin.

Other advances also play a significant part in this improved survival, but total parenteral feeding is credited with a major role.

Similarly people who have lost weight and are seriously weakened sometimes receive this kind of feeding to strengthen them for the ordeal of major surgery. Although no statistics are available, Dr. Fischer senses he has been "able to get all sorts of elderly persons through operations" he feels they would not otherwise have survived.

Despite its advantages doctors warn against its indiscriminate or careless use. Dr. Claude E. Welch, MGH surgeon, cautions:

"It's a very fine method of treatment, but it has its complications. It's dangerous in the presence of unskilled hands. It's dangerous in the presence of sepsis [infection], and there may be other areas in which it is contraindicated.

". . . It's been of inestimable help in many people. So I'm sure the values far outweigh the disadvantages."

Dr. John A. Ryan, Jr., an MGH Surgical Resident, examined the records of 200 consecutive patients treated with total parenteral nutrition. About four percent experienced complications during the insertion of the flexible tube into the vein. At some point during their care about seven percent had bouts with infection from the tube. All but 3 of the 200 patients recovered from these complications.

"The patients receiving this treatment," said Dr. Clyde H. Beck, Jr., Director of the Dialysis Unit, "are those with a substantial risk of dying." In such patients the lifesaving potential of the procedure outweighs the danger of complications.

To minimize the risk of adverse side effects, the Hyperalimentation Unit has adopted a carefully worked out protocol. Precisely designed kits containing necessary materials for insertion of the catheter and for the changing of dressings are stockpiled throughout the hospital. Prepackaging makes it easy to begin with the correct materials.

With local anesthesia the surgeon in-

(Concluded on Page 4)

Miss Karen Phillips, RN, right, shows Miss Viola Reed, RN, how to change the dressing of a patient being fed by new technique.

"Tremendous Involvement" of Entire Hospital

(Concluded from Page 3)

serts the tube into the vein of the patient who remains in his own bed. After that, a nurse changes the dressing every 48 hours.

By strict adherence to its regulations the MGH has kept its infection rate well below the average. The cardinal rule is to use the tube exclusively for total parenteral nutrition – no measurements or blood sampling allowed through it, for example. Another must is to change a bandage if it becomes wet or contaminated.

The rigid protocol includes the preparation of the nutrients. Under the watchful eye of Richard Giovanoni, Registered Pharmacist, the MGH Pharmacy prepares a fresh batch every day. The ingredients sent by the drug company are examined for content and contamination before they are prepared. Only the exact amount ordered by the doctors is mixed. Despite the clean-room precautions taken during the mixing process which is done under a hood that blows filtered air through the compounding area, the final product is again tested for germs.

In addition to rigid rules the Hyperalimentation Unit discourages ordering the treatment for patients suffering from certain types of infections. The physicians also avoid it in those in whom cancer has spread to an incurable point. Otherwise they might prolong life and suffering without hope. For many other types of cancer patients, however, the treatment can often strengthen a person nutritionally while standard therapy combats the disease itself.

The MGH's early entry into total parenteral nutrition came in part from a coincidence. When he was conducting his original experiments at the University of Pennsylvania, Dr. Dudrick worked in the laboratory next to a first-year medical student, Ronald M. Abel, who began an MGH internship in 1966.

Dr. Dudrick himself later visited the MGH and demonstrated how he inserts the tube. Those present have since taught a number of other surgeons.

In 1970 the hospital organized the Hyperalimentation Unit under Dr. Fischer. With Dr. Fischer, Drs. William M. Abbott and Abel established a hospitalwide system.

In other institutions that use the procedure, all the patients are grouped into one unit. Here the Hyperalimentation Unit serves in a consulting capacity.

The Pharmacy under John Webb plays a key role. "We have become a consultant to the doctor," Mr. Webb said. "At the same time we get closer to the patient and can see the results right at the bedside."

Pharmacy expertise is important because of the complicated chemistry involved. Varying types of solutions are tailored to the different problems from which the patients suffer.

Two nurses, Miss Rita Colley, RN, and Miss Karen Phillips, RN, staff the unit. They visit the patients being treated all over the hospital and sometimes change the dressings, but their primary role is that of consultant and teacher. With Miss Beverly Brooks, RN, of Staff Education they have certified about 450 nurses to change dressings and otherwise care for the patients. Their successful goal has been to have all RNs certified to change the bandages and have at least two nurses on each floor qualified to certify others.

About 50 of those trained in the MGH workshops have journeyed from other hospitals in Canada and the United States for this instruction given with the assistance of the Department of Nursing, unit teachers, head nurses, supervisors, and Staff Education.

"There's been a tremendous involvement of all parts of the hospital," Dr. Fischer said. "Besides nursing and the Pharmacy, some of our investigators have come from parts of the Medical Service like the Renal Group, the Infectious Disease Group, and the GI Group.

"I don't think it's been at all fully utilized." Dr. Fischer is exploring the possibility of helping very ill liver-disease patients over their nutritional problem. Dr. Abel is hopeful that some heart-surgery patients may benefit.

Babies Hospital in New York City has already begun using the technique successfully for premature infants, a use believed likely to spread. In California one hospital has discharged several patients for long-term treatment at home. Dr. Abel envisions another type of advance:

"There will be improvements in the intravenous diets themselves and improved techniques that will decrease the complication rate even more."

Miss Rita Colley, RN, standing right, demonstrates the assembly of the intravenous tubing and filter to nurses attending a workshop on the care of patients undergoing "total parenteral nutrition."

The Impossible Dream

Several of the patients treated with total parenteral nutrition have developed unusual psychological reactions.

Although the intravenous diet is tasteless, a few persons have experienced their own sensations. One night two such patients in different parts of the hospital each dreamed of root beer.

One woman, who had never cooked Italian food, in her dreams concocted wild Italian recipes. Another craved "poor man's spaghetti," a dish of shells with a can of tomatoes her mother had made during the depression.

Mouthing Homilies, Cutting Off Funds

(Continued from Page 1)

schools and hospitals around the country – in rural areas as well as large urban centers. With their counterparts from other programs, they help form a cadre that turns out some of the nation's finest doctors. Their care of patients directly benefits many. Their research uncovers new diagnostic methods and treatment.

Indeed these young men and women constitute a major portion of our investment in medical research of the future. Their teaching provides an equally important contribution. By inspiring others to become dedicated doctors, they serve the nation's future. To terminate this program in the interest of saving a comparatively small sum is to place our medical education and research activities in jeopardy.

It is ironic that the government chooses this time to talk in such terms. On the one hand we are mouthing homilies about doing more to help minority groups. On the other we are cutting off programs like this one which offer them their chance. There are widespread examples of minority physicians who are now qualified for advanced special programs. Yet at the very moment they are able to take advantage of this training, the programs themselves are disappearing. Just last Friday I learned of another such case. A black physician who graduated from Harvard Medical School wants to further his training at this hospital. But the training grant which had been available will no longer exist at the time he would be able to come.

It is by no means only the minority groups who will suffer. These clinical and research training grants have been providing an avenue for all those unable to afford specialized education. For example, it costs roughly $15,000 a year to support a physician and his family. Of this the grants only provide about two-thirds. Thus many trainees are compelled to work nights or weekends to make ends meet. The wealthier segment of the population can manage their own support. Most people cannot. Wiping out the grants will merely widen the chasm which separates the 'haves' from the 'have-nots.'

What about the contributions of the trainee to the institution that educates him? Does he only take and give nothing in return? At the Massachusetts General Hospital these bright young men and women contribute to the intellectual ferment which makes this the outstanding medical institution it is. Intangible but real, this climate stimulates to greater achievement the doctors already here. And it makes possible the very charged atmosphere which attracts other brilliant physicians to come here in the first place.

While still learning, many trainees make major contributions to alleviate the sufferings of man. Let me cite just one recent example at the Massachusetts General Hospital. One of our trainees led a research project looking into one of the most compelling problems in treating heart patients. The problem was this: to strengthen the heart's weakened ability to pump, hundreds of thousands of patients require some form of digitalis or its derivatives. This highly beneficial drug is a powerful medication which must be carefully regulated. Either too much or too little can have serious consequences. Unfortunately until this trainee began his research here, there was no reliable way to monitor the dosage required by each individual. What this young scientist accomplished had for years eluded the grasp of experienced researchers. He devised a highly reliable test [radioactive assay] for measuring digitalis in the body. With this the cardiologist can now regulate the dosage *before* any harmful side effects manifest themselves. This test is now nationally accepted and credited with saving not only millions of dollars by decreasing the number of days spent in hospitals but also saving lives of people particularly susceptible to the drug itself.

Opponents of the training grants raise two major arguments. First, they ask why the federal government should subsidize people who will use their training to earn $100,000 a year. Some do go on to command high salaries after their very long years of preparation. But four out of five of those trained at this hospital end up in academic settings where they earn considerably less than those in medical practice. And the same can be said for those trained at other institutions. We should not penalize the many for the few.

The second major question asked is, 'Why should we continue to develop specialties that are already overpopulated when we need good primary physicians?' We *do* need good primary physicians. But we also need good specialists. We may well be raising too many neurosurgeons, or too many neurologists, or too many psychiatrists, or too many cardiologists. But let's assess our needs. Let's determine how many we require in each specialty. *Then* let's eliminate some or all of the grants awarded in overcrowded fields. And let's maintain or add to the number of grants we award in the underpopulated ones. Stated another way, it makes no sense to annihilate the fat patient in order to make him lose weight.

Another threatened federal cutback

(Concluded on Page 6)

Television cameras whir, and still cameras click during testimony. Inset upper left shows Dr. Charles C. Edwards (on right), new Assistant Secretary of Health, Education, and Welfare, making his first appearance before the Senate Subcommittee on Health.

Why Go Into Research Anymore?

(Concluded from Page 5)

I'd like to comment on involves the Children and Youth and the Maternal and Infant Care programs. I wish to describe how the proposed 58 percent reduction of funds for these projects would affect just one city. Chelsea, Mass., is a community of 31,000 that has suffered from a chronic lack of health care. A lead-screening program completed just last week has uncovered an incredible problem. Of 515 children tested, 150 have high lead levels. Imagine that! Twenty-nine percent suffer from having too much lead in their blood. About 110 houses were tested and found to contain lead paint. Yet the problem persists. Because most of the houses are eventually to be cleared for urban renewal, nobody wants to force the landlords to remedy the appalling situation.

In 1966 the Massachusetts General Hospital examined 348 Chelsea schoolchildren. One-third had a visual problem. One in ten had suffered some hearing loss. Seventy-seven percent needed dental care. Sixteen percent had speech defects. Sixty-one percent had medical problems. And twenty-six percent had a significant emotional and/or learning problem.

By no means are the health deficiencies of Chelsea limited to children. On Nov. 11, 1972, the city conducted a 'Hope Day' to screen for four types of problems: ear, teeth, eye, and foot. More than half (57 percent) of those screened were older than 60 years of age. Eight out of ten of all those screened had some readily identifiable medical problem. And this, despite the fact the program provided examinations for only four problems! Forty-two percent of those responding said they had no doctor at all.

About 18 months ago the MGH moved into Chelsea to try to provide some needed health services for children. This has been a small program geared more to prevent the old dike from crumbling than to construct a badly needed new one. Now this hospital is readying a program that would eventually expand desperately needed care to all the Chelsea residents who require it. We are modeling this effort on our highly successful MGH-Charlestown Bunker Hill Health Center. Four of every five Charlestown residents are enrolled in this center. Many receive free care provided with funds from the Children and Youth grant. The same grant – now threatened – forms a major part of our commitment to Chelsea. If this money is slashed as projected, we would have to seriously curtail our existing efforts in Charlestown and our existing and envisioned efforts in Chelsea.

Why don't these people pay for their own health needs? The answer is simple. They just can't afford to. Nearly one Chelsea family in five, for example, earns less than $3,000 a year. For thousands of such communities around the nation, I can only urge the adoption of H.R. 708 to extend the Children and Youth and the Maternal and Infant Care programs for another year. The Chelseas and Charlestowns of America must not be destroyed.

Until now for the most part I have been discussing proposed reductions. I'd like to mention briefly one cut already imposed. The General Research Support Grant has already been reduced by 63 percent. This grant is one given institutions which have demonstrated the ability to manage research funds wisely. At the MGH we use these moneys to keep important investigations alive. We support young investigators until they gain financial assistance from other organizations. In the past, many outstanding projects have survived in this way and later flourished to the benefit of mankind. Now we have a drastically reduced financial pool to tide over worthy studies.

As a result many programs face serious slowdowns or even extinction. This is indeed unfortunate. Such events can only produce waste and inefficiency. Obviously you just can't get rid of a technician today and hire a new one next week. These are skilled people highly trained for a specific task. To tool up and mobilize the entire machinery of research in a cyclic way makes for economic chaos – not rational planning. One might ask why the government has to pay for research in the first place. The answer is that private foundations don't have enough money to shoulder the massive burden alone. What about industry? To seek large sums from drug companies and other private firms is to invite interference and threaten the objectivity of scientific studies.

Finally I would like to leave you with a philosophical question about where we are headed. There is in Washington today an atmosphere that is creating a climate of foreboding throughout the scientific community. I won't emphasize the governmental dictum that says research must produce a specific result. I won't emphasize the philosophy which tells scientists to forget studies which provide the core of knowledge actually needed to lay the groundwork for such specific achievements. But I will tell you one brief anecdote.

Several weeks ago a group of young investigators here were discussing the wholesale slashes in the funding of most areas of research. At one point, their chief walked into the laboratory. One of the young researchers turned to him and said, 'If the government limits the amount of money, only a few projects will receive support. Will these few be those of the beginner like me or the scientist like you who has already earned an international reputation? How will the young researcher ever get started?' At this point the young man asked a question on the minds of young people everywhere. 'Why should the high school student go into research anymore, and why should I continue?' Senator Kennedy, that's a question I'd like you to answer.

Dr. Charles A. Sanders, center, MGH General Director, testifying at hearing of Senate Subcommittee on Health

"He Tells You the Reasons Why"

(Concluded from Page 8)

ever he questioned a teaching method, he was not averse to sharing his ideas with the teacher.

Along the way he alienated a handful of instructors who took his comments personally. He achieved a record for scholastic consistency – expulsion from a class in grade school, high school, and college.

Nevertheless he managed to earn a Phi Beta Kappa key in 1940 when he graduated from Hobart College in Geneva, N.Y. After obtaining his medical doctorate at New York University School of Medicine, he interned at Delaware Hospital in Wilmington, Del. Duty on the Pacific island of Saipan consumed two and one-half years during World War II.

As an Army Medical Corps captain, his most harrowing experience came one morning when he awoke to find a Japanese soldier peering into his tent. A captured warrior, the unarmed Japanese had been planted there as a practical joke. Today Dr. Neumann, who has a keen sense of humor, laughs about the incident.

He returned to the United States to take his residency in psychiatry. The Dean of his former medical school, however, had another thought. He knew Dr. Neumann had earned his way through college and medical school as a YMCA administrator.

"We need doctors in hospital administration," he told the young physician. The idea appealed to Dr. Neumann.

A couple of administrative residencies and a degree in hospital administration later found him at the MGH as an Assistant Director. His plan to leave after three years melted in the face of a love affair with the hospital and its employees.

He has kept his door open to hear the complaints and problems of the employees and championed the cause for their improved working conditions.

"Whether it is the man stoking the incinerator or the chief of service," said Associate Director Henry J. Murphy, "he gives them equal attention."

Rarely ruffled, his even disposition calms others in difficult situations.

"He's always been personnel conscious – really a sort of godfather to the employees," said his longtime Executive Secretary, Miss S. Gertrude Devine.

As Personnel Director, Mrs. Ruth MacRobert found him "one of the best listeners I've ever met. You have absolute trust and faith that he'll never let you down.

"If he does disagree, he tells you the reasons why. You understand his thinking process. Even if you don't agree with his decision, you feel as though you have been participating in it."

In her duties as Director of Social Service, Miss Eleanor Clark has profited from "his constant availability and his total willingness to work on any difficulty that comes up about patient care. These factors have really been an enormous help in solving problems and making things work."

A number of years ago, members of Dr. Neumann's department chiefs meeting group observed that the hospital was not as clean as they would have liked. He organized a committee from among those complaining and named himself chairman. For five years he devoted almost all his lunchtime heading a decorating detail. This action had a psychological impact on employees who had been thoughtlessly littering the floors.

A shy, quiet man, through all his achievements Dr. Neumann managed to stay in the shadow of whoever has occupied the General Director's chair. Miss Mary E. Macdonald, RN, Director of Nursing, commented:

"I found him unique in his abject distaste for the limelight and his willingness to shine only in the accomplishments of his staff."

Many of his subordinates knew him simply as Ott, a nickname that stuck when a preparatory school friend began calling him Otto after a character in a book they were studying.

This kind of informality characterized his actions as Administrator. Yet in attire, he has maintained a certain degree of formality. Associate Director and Comptroller Lawrence E. Martin tells of the time Dr. Neumann accompanied a group of curious nonskiers to a New Hampshire slope. All his colleagues wore ski togs, but Dr. Neumann appeared in a fashionable overcoat and homburg.

He and his wife, Virginia, and the two youngest of their five children will live in Scarsdale, N.Y. At The Rockefeller Foundation to start a six-month orientation July 1, he will rejoin Dr. John H. Knowles, the Foundation's President, to renew a close association nurtured during the recent 10 years that Dr. Knowles was General Director of the MGH. Is Dr. Neumann giving up medicine?

"The Rockefeller," he replied, "has a big health section as well as its conquest-of-hunger program. This too is medically oriented because it results in a saving of lives. I have ideas, and I think it's just a matter of spreading myself out a little more."

Sen. Edward M. Kennedy makes a point during Senate subcommittee hearing.

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Three Years Turned Into Twenty-Four

In 1949 a young New York doctor joined the MGH administrative team for a maximum of "three years." Twenty-four years later Ellsworth Traver Neumann has finally torn himself away.

On Jan. 1, 1974, he will become Vice-President for Administration of The Rockefeller Foundation in New York City. For 21 of his 24 years at the MGH, he has directed the daily operations of the hospital. As Administrator he has guided the day-to-day affairs under the supervision of four successive General Directors and one Acting General Director. Preoccupation with the daily affairs, however, has not prevented him from looking into the future.

"He has an ability to see ahead which often led the MGH to prepare for a problem before it arrived," one admiring colleague said.

It was largely Dr. Neumann who, starting 20 years ago, devised a series of changes that put the hospital on an efficient economic footing. Among them was the concept of "boarding" patients.

Until then the MGH had a strict rule that prevented patients in one of its units like the Baker Memorial from being bedded in another like the General Hospital. If the Baker beds were filled, the General Hospital might have large numbers of empty beds. Yet patients scheduled for admission to the Baker Memorial had to be turned away.

Dr. Neumann resolved the situation by effecting changes which made it possible to "board" patients in another unit. He also successfully urged converting the large 16-patient rooms which used to make up the White Building to 4-bed rooms.

Because men and women cannot be put in the same room, all the female beds might be occupied while other rooms might have one male and 15 empty beds.

"Mathematically the change worked beautifully," Dr. Neumann recalled. "By converting 16-bed rooms to 4-bed rooms, we obtained the equivalent of about 19 more beds." In a short time the hospital recouped the $90,000 it cost to partition the rooms.

Arguing for partition, Dr. Neumann had told the Board of Trustees that Medicare would eventually become the law of the land and that it would include the privilege of semiprivate facilities. It was not until 10 years later that Congress adopted Medicare. When its time came, it *did* include the privilege of semiprivate rooms.

Dr. Neumann also anticipated Medicare working with Miss Eleanor Clark, Director of Social Service, in the establishment of an office to oversee the transfer of patients ready for treatment in extended-care facilities. As a result the MGH set up its Transfer Office one year before Medicare required other hospitals to do the same.

Ellsworth T. Neumann, MD

Through various efficiencies the MGH was able to double its nursing staff. "The way I saw medicine," Dr. Neumann said, "you needed more nurses to provide the best possible care."

It was also to improve patient care that some 20 years ago he began a free-wheeling discussion group of department heads in the Baker Memorial. As time wore on, the group enlarged to encompass department chiefs throughout the hospital.

Dr. Neumann also initiated the Administrative Committee, a group of top executives who resolve administrative problems. Both John E. Lawrence, Chairman of the Board of Trustees, and Dr. Charles A. Sanders, General Director, were thinking partly of his many innovations when they commented on his 21 years as Administrator. Mr. Lawrence termed him "a man who has worked tirelessly and unselfishly to keep the MGH in the forefront of American hospitals."

Dr. Sanders has found him an executive "who worked quietly and made many important contributions to the MGH and its employees."

Ideas come naturally to Dr. Neumann.

"I think," he said, "it's because I have a computer mind that malfunctions and skips me over the conventional wisdom. I believe I've retained a childhood attitude about things. Most people's imagination gets killed by the school system. For some reason mine wasn't."

Occasionally during his formative years, his creative mind would prove a handicap. Born Oct. 16, 1919, in Wappingers Falls, N.Y., he attended schools and colleges in New York State. When-

(Concluded on Page 7)

MGH News

Vol. 32 No. 6 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS September-October, 1973

Transplant Aids Youth With "Fatal" Type Anemia

A 17-year-old Revere youth who underwent a bone marrow transplantation six months ago at the MGH has apparently joined a select group who have survived a usually fatal anemia. What's more he has also overcome an almost universally fatal type of reaction to the marrow donated by his brother.

Jeffrey Bushway, son of Mr. and Mrs. Glenn Bushway of 599 Lynn St., Revere, underwent the transplant March 6 at the MGH. Doctors caution that it is too early to say definitely, but that Jeffrey seems to have licked overwhelming odds.

Medical literature records only about 20 cases of successful bone marrow transplants for aplastic anemia, the type that threatened Jeffrey's life.

When he entered the MGH on Feb. 16, he had to lean on the bannister to climb stairs. Five weeks after the transplant, he was playing basketball and baseball.

Aplastic anemia is a type that raises havoc with the bone marrow factory which produces blood. An examination of key components of his blood and a study of his marrow showed that Jeffrey suffered from the worst type. His marrow factory had essentially ceased to function. With standard treatment he could have expected a rapid downhill course and almost certain death.

Dr. Leonard Ellman, who with Dr. Bernard Jacobsen treated Jeffrey, recommended a transplant. In such cases the decision must come early since delay usually results in infections in the

(Concluded on Page 3)

100th ANNIVERSARY

Nursing Forged a Triumph Out of Drudgery

Hours that stretched from before dawn well into the evening; backbreaking drudgery of washing filthy clothing and foul dressings; scrubbing beds, floors, and walls; cooking meals and washing dishes; mending linens; and tending to the sick – this was the lot of untrained nurses in hospitals in the years following the Civil War. The pay was a pittance – $7.50 a month. The only fringe benefit to keep those hardy souls going was the knowledge that the patients desperately needed their services. Work was often accomplished in the face of a physician's grudging consent.

The transformation from those untrained women to the highly trained and often specialized women – and men – who form an integral part of the health-care team of today occurred largely through the establishment of nursing schools organized on the Nightingale plan.

Just a century ago the first of these diploma schools sprang up in three eastern cities: New York, New Haven, and Boston. They were founded on many of the ideals expounded by Florence Nightingale after her experiences in the Crimean War and then in her nursing school at St. Thomas's Hospital, London.

The major idea behind the schools was to develop nursing as a secular career and to organize a plan of education formalizing the training of nurses who would learn their profession while actually working in a hospital. The authority for and management of the program was to be the responsibility of a Board of Managers and an appointed nurse director as distinguished from the hospital director, medical staff, and trustees.

(Today, of the original three, only the Massachusetts General Hospital School of Nursing survives to celebrate its centennial this fall. A three-day program is being conducted at the Sheraton Boston from September 28-30.)

In the spring of 1873, the Women's

(Continued on Page 4)

Jeffrey Bushway . . . Back in the Ballgame

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EDITORIAL:

Education for Better Health Care

The MGH Dispatch Department's work-study program is noteworthy for several reasons. First, the program, described on page 8 of this issue, offers an opportunity to the young people themselves. Second, the participants provide an important service to the hospital. Too often people think of hospitals in terms of doctors and nurses. While they and other professionals play a key role, no hospital could survive without the less conspicuous contributions made by other departments. Dispatch service, maintenance, housekeeping, secretaries, bookkeepers, security, and clerks, to name just a few. These are some of the unsung heroes of the medical team – the offensive linemen who open the holes through which the professionals dart. On the football field a missed block on the part of one lineman can defeat a well-conceived play. In a hospital a test tube delivered in an inefficient manner can frustrate the efforts of a good medical team. Thus the article beginning on page 8 calls attention to a program developed by one of these vital but little-known departments.

But there is still another reason why the feature is significant: It describes an additional way in which the MGH fulfills its role in education. As a Harvard Medical School teaching hospital, the MGH plays a well-known part in educating physicians. In fact in 1971 it was estimated that the institution trains about the same number of interns, residents, and a third group of MDs called fellows as the total number of students in Harvard Medical School. In addition the hospital is a major cog in the education of the medical school students themselves. It also offers many courses for physicians from hospitals throughout the world. Aside from doctors the MGH conducts educational programs for a variety of medically related positions. Some, like the internships in dietetics, are formal. Others calling for on-the-job training are less structured.

One of the most formal is described in a page 1 article on the MGH School of Nursing. As the only Nightingale-inspired School of Nursing to reach its 100th birthday, the school has achieved a unique distinction. Its graduates serve in all 50 states and around the world. Their MGH caps have long symbolized excellence in education. The school itself epitomizes the quality of education available at the hospital in many fields. And these various teaching programs have made of the General one of the leading educational institutions in the United States. In turn the excellent professionals and nonprofessionals attracted to and trained in this atmosphere have helped produce one of the great centers of patient care.

Letter to the Editor

Dear Editor:

I look forward to each issue and read every page! The *MGH News* is the best single source of information about the people and services which comprise the MGH, for those of us who work here as well as for alumni and other friends of the hospital.

Of particular interest was the May 1973 lead article, "Saving Newborn Babies Thought Doomed to Die," a beautifully descriptive piece. I noted one omission. The contribution of the registered dietitian and dietary supportive personnel was not identified in relation to the Pediatric Intensive Care Unit. Certainly limitations of space influence the priorities of the author; all details cannot be included. My remarks are intended to underscore the description of the highly specialized care provided here!

The problems of nutritional care of the wee mortals in the Newborn Unit parallel other care aspects in complexity, requiring precision in individualizing the formula prescription and exquisite technique in preparing the feedings in the multiple miniscule amounts which the nurses then administer. Normal newborns who require bottle feedings thrive on any one of a number of commercially prepared sterilized infant formulas available in disposable units. Infants of low birth weight have underdeveloped physiologic and biochemical systems and cannot tolerate standard formulas. Pharmaceutical houses have developed some two or three highly sophisticated chemically defined feedings in which protein, sugar, fat, and even mineral components are modified so that the resulting formula can be utilized.

The registered dietitian has a role in consultation with the physicians, in orientation of resident and nursing staff, patient care planning and diet counseling with parents as well as in provision of the patients' food, be it formula, tube feeding (or more traditional meat and potatoes) for pediatric patients.

ANNIE GALBRAITH, R.D.
Associate Director
Dietary Department and
Dietetic Internship, MGH

Bone Marrow Transplant Aids Anemic Youth

(Concluded from Page 1)

patient which then often doom the transplant to failure.

Dr. Paul S. Russell, Director of the MGH Transplantation Unit, and Dr. A. Benedict Cosimi, Staff Surgeon of the Unit, agreed. Jeffrey and his parents consented.

To increase the chance for success, it became necessary to find a donor whose genetic makeup approximated that of the recipient. Using techniques earlier pioneered by Dr. Henry J. Winn of the MGH for matching donor to recipient, Drs. Thomas C. Fuller and Janet Plate found that both of Jeffrey's younger brothers, Scott and Stephen, presented an excellent match.

Surgeons thought they might require marrow from both youngsters, each weighing only 100 pounds, to provide enough for the 6-foot, 220-pound Jeffrey.

Both brothers agreed to help Jeffrey, and their parents consented. Under the law, however, court authorization is required before the procedure can take place. Permission was granted.

Four days before the transplant the doctors began treating Jeffrey with high doses of cyclophosphamide, a chemical that removes the recipient's capacity to reject the bone marrow graft.

This sort of rejection is a possibility in almost all kinds of transplant operations. Transplanted bone marrow presents an additional problem because its cells can also react against the recipient's own cells, the rejection known as graft-vs.-host reaction.

To help prevent such an occurrence, the doctors gave Jeffrey an injection of antilymphocyte globulin, a "horse serum" developed in large part by the MGH for kidney transplants. The theory is that the serum will suppress his own cells (lymphoid) and remain long enough to knock out the problem cells in the transplanted marrow.

On March 6 Dr. Cosimi and Dr. John D. Whelchel, surgical fellow in the Transplantation Unit, used a needle to remove bone marrow from the hips and breastbone of 12-year-old Scott who had been anesthetized. Enough marrow was obtained so that 15-year-old Stephen, who was all ready to donate, did not have to. Stephen's blood was used to transfuse Jeffrey until the new graft could take over. To a healthy boy like Scott the donated marrow is quickly replaced by nature without any harmful effect.

Dr. Cosimi injected Scott's marrow into Jeffrey's bloodstream.

"The marrow lands where it is supposed to be," Dr. Russell said, "and sets up housekeeping." Jeffrey went into isolation in the hospital's Transplantation Unit to reduce the hazard of infection, a risk because of his medication to combat rejection of the transplanted marrow. Since surgery he has received small doses of another drug (methotrexate) to keep the donor cells from the marrow of his brother Scott from reacting with his own cells.

He was discharged 30 days after the transplant. A dreaded graft-vs.-host reaction brought him back April 23. By the end of May his condition deteriorated to the point doctors despaired of his surviving. So severe a graft-vs.-host reaction as his had previously been universally considered fatal.

After treatment with antilymphocyte globulin, he improved enough to leave the hospital June 4, returning frequently until his final discharge on June 16.

Now his various blood counts fall in the normal range, and the Revere High School junior can work or play like any healthy person. Physicians cannot be certain but suspect that his recovery from such severe graft-vs.-host disease resulted from antilymphocyte globulin treatment. Likewise there was still some question whether the bone marrow permitting his return to health was his own, somehow rejuvenated, or Scott's. By studying the chromosomes (a portion of the cells containing the units of heredity) from the cells, Dr. Leonard Atkins, a pathologist, determined that the marrow now serving Jeffrey is that of Scott.

While Jeffrey has passed the most critical period, some danger of rejection of his brother's cells remains.

Jeffrey's illness had begun innocently enough. Before his admission to the MGH he had come to the neighboring Massachusetts Eye and Ear Infirmary because of what seemed to be a minor problem, a nosebleed. He was transferred to the MGH when his critical blood condition was discovered.

Supported by grants from the National Institutes of Health, the MGH has been investigating the use of bone marrow transplantations for leukemia and inherited deficiency diseases.

Only a small percentage of such transplants tried around the world have succeeded. The success rate has been particularly low for aplastic anemia.

Some bone marrow transplantations have occasionally helped in other blood diseases such as leukemia.

Just under 1,000 Americans a year develop aplastic anemia. Since one important cause is drugs, the disease may become more widespread in the future. Another potential cause is radiation exposure from a nuclear accident or bombing.

Jeffrey in center with benefactors, brothers Stephen, left, and Scott, right

The First Year of the School Was Rocky Indeed

(Continued from Page 1)

Education Association of Boston suggested the founding of a nursing school for women interested in a self-supporting career. A group of socially prominent women and men, implementing the idea, organized a committee to explore the possibilities of establishing a school in connection with the MGH. Although physician opposition to the concept of trained nurses was strong, the MGH Trustees accepted the proposal with certain conditions. The overriding one was that "this relation between the Hospital and the Training School shall continue during the pleasure of the trustees."

On November 1, the Boston Training School for Nurses (its name was later changed to its present one) opened with a Superintendent, Mrs. Billings, two head nurses with nursing experience in private homes, and four pupils.

The first student enrolled, according to the early records, was Margaret Russell: "Entered November 1, 1873. She was of Scotch descent . . . Age 35. Graduated November 1, 1875. Private nurse, Boston, Mass., and a great favorite in the families of her patients. During her course in the school she was trustworthy and faithful. Died in Massachusetts General Hospital August 10, 1881." Of the original four students, two besides Miss Russell graduated in 1875.

That first year of the school was rocky indeed. The first Superintendent stayed three months; the next for only ten months. Hospital physicians refused to teach student nurses, so the managers of the school had to secure lecturers from outside sources. Lectures were given only once a week. Students provided nursing for a small part of the hospital called the Brick Building.

By the end of 1876, under the direction of Miss Linda Richards, the school had finally secured a firm foothold. The hospital Trustees reported:

"The incorporation of the nurses of the Training School into the service of the Hospital is a success. There are at present 52 of them [the school by then had charge of all nursing in the hospital], and their number can be increased when proper accommodations can be furnished. The Brick, now called the Nurses' Building, is occupied by them. Their employment is a mutual benefit to the School and to the Hospital, and with the right notions of their duties, they will eventually prove a blessing to the sick of all classes in the community."

Improvements came steadily during the following years, although in 1880 students were still mopping, sweeping, and scrubbing. Some heavier manual labor, such as lugging ice and washing corridors, was delegated to ward maids. Lessons in "sick cookery" were introduced.

Miss Mary Davis, an early graduate, wrote:

"We realized early in our training that many things we had to do had little relation to nursing. We took the training as fundamental, not as an incidental occupation, and although the incidentals were many and grievous, we saw the opportunity to get what we were after."

Five years after the school opened, caps were introduced, but no uniforms were worn until some years later. In the wake of an early experiment with blue and white checked dresses (which faded when laundered), the black and white checked uniform was adopted in 1889. Although styles have been updated, the uniforms of the MGH student nurses still retain the distinctive black and white checks.

On January 1, 1896, the Board of Managers of the school transferred its funds and management to the Trustees of the MGH. Three years later the Trustees voted to appoint (to the School of Nursing) an Advisory Committee. Its chairman was to be a member of the Board of Trustees.

In Sara E. Parsons' *History of the Massachusetts General Hospital Training School for Nurses,* she says of students during the 1890s:

"It always seemed as if more was required from the pupils than it was humanly possible to accomplish, but pupils learned under the system that their capacities exceeded their expectations."

She also commented, as the school celebrated its first half century, "The one outstanding error that has prevailed throughout the whole nursing system, and this School cannot be excepted, has been the assumption that overwork and severe discipline were necessary and even desirable concomitants of nurses in training. When it began to be understood that there was a difference between the self-imposed hardships and sacrifices of the religious orders and the preparation of modern young women for a profession, it was then impossible for economic reasons to lift the superfluous load that had broken

Nurses watched intently from the gallery as Dr. J. Collins Warren performed surgery (during the 1880s). The operating room nurse (to right of surgeons) was a graduate of the school in 1888.

the health of so many good women during the early years of training schools for nurses, when only about 50 percent of the pupils could or would stand the strain."

As medical and surgical skills improved during the early years of this century, nursing education in diploma schools kept pace. At the MGH the program was expanded from two years to three in 1901. The first full-time instructors of sciences and practical nursing procedures were hired in 1910 and 1912 respectively.

Miss Helen Sherwin, Coordinator of Science Instruction and Psychiatric Nursing, who joined the faculty in 1945, recalls that "at times students were responsible for 75 to 80 percent of the care of patients during days, evenings, and nights. The class entering in 1957 was the first free of evening and night assignments during their first year.

"Preclinical [early freshmen] classes had to be completed within 19 weeks because some students were placed on night duty immediately after that. On nights, demands were varied and extensive; a student was expected to meet them adequately. Graduates for support and supervision were few. Even so, in 1945 student hours were reduced so that each had a full day off each week. In September 1946, tuition increased to $100; fees, uniforms, and books increased the charges to students to $258 for the three years.

"It sounds tough, and it was. But the students had many satisfactions. They knew beyond any doubt that they were needed, valued, and respected for survival – if they did survive."

This fall, tuition for the 119-week program will be $2,800. Additional costs will be about $2,000.

Other hospitals responded to the early examples set by the MGH School of Nursing and the proof that trained nurses were, in spite of their own hardships, a "blessing to the sick" as well as to busy physicians. Hospitals mushroomed across the country as people realized that better medical and nursing care could often be obtained in hospitals rather than at home. Demands for trained nurses to staff hospitals skyrocketed.

By 1900 there were 432 diploma schools; 1930 saw the peak with 1,844 such schools. Today, because of high costs, more stringent educational standards, and competition from collegiate nursing programs which offer a bachelor's degree or associate's degree, the number of diploma schools has dwindled to about 540. The MGH School of Nursing, with over 300 students enrolled and a faculty of 61, is still going strong. Its 6,220 graduates have worked in all 50 states and throughout the world.

A graduate of 1887 (left photograph) wears the school cap, but the black and white checked uniform, worn in the modern version by today's students, had not yet been adopted. One early graduate of the school said, "If any nurse wore a dress of pronounced design, she was threatened with a uniform."

Cooperative arrangements with other hospitals and many community agencies provide broader experience for MGH student nurses, and the opportunity to combine liberal arts courses with education in nursing has been offered in the past with programs connected with Simmons College, Radcliffe College, and Northeastern University. The school does not now affiliate with a college or university to offer a B.S. or A.A. degree as an integral part of the curriculum.

Miss Natalie Petzold, RN, Director of the MGH School of Nursing, said:

"The future of the school lies in making the program as educationally sound as possible. Since nursing is a service to the public, the program must be realistically attuned to the health-care needs of people and the future roles of the professional nurse in responding to these needs.

"We owe the students and the patients that kind of program, providing a basis for career mobility, continued education, and a high level of care.

"One of the problems the School of Nursing faculty is faced with is how the curriculum should be developed. We have to ask ourselves, 'What is our student population like? What can they and should they learn in a basic program? What should our objectives be? What are the unique contributions of nursing within the health team? How can the student learn effectively to contribute to change and to further develop the discipline of nursing? Where and in what types of settings will our graduates be working in the future?' "

Only within the past 10 years have nursing students become less depended upon for nursing service within the MGH. "We now have the leeway to provide students with a variety of patient-care experiences," Miss Petzold said. "We try to provide opportunities for students to recognize that health needs exist beyond the walls of the MGH. Developing an understanding of different people and different cultures and a flexibility in one's outlook are things we try to build into the curriculum.

"Whatever the educational pattern for the future is, it is our aim that it shall serve the public well in terms of nursing needs, and it shall offer quality education with every possible career and educational advantage to its students."

Work-Study Students: Pride in Achievement

(Concluded from Page 8)

Boston High School who had worked part time in the scheduling office during high school, is now the assistant supervisor of other work-study students in the Department.

Teacher-coordinators from Boston High School visit Miss Fitzpatrick and Mr. Simons weekly to assess each student's performance and attendance and to discuss any problems.

Joseph Sullivan, Job Supervisor at Boston High School, said, "Mr. Katzer has been more than cooperative and helpful in placing students. Jobs at the MGH are among the highest-paying of any in which we place students. That, plus the variety of assignments they accomplish while working in the Dispatch Department, makes the MGH one of the most eagerly sought placements for the students. There is a waiting list to work there."

Richard McLaughlin worked about six months in the Dispatch Department before graduating from Boston High School last June. He has been employed full time since then. When asked what might have happened if he had not enrolled in the Boston High work-study program, he answered simply:

"I don't know. It would have been tough. My older brother didn't finish school, and things have been hard for him."

Mr. McLaughlin thinks the 40 hours a week he works now seem "easy" because during his school days he held two jobs – evenings and weekends – besides the one at the MGH. He is now considering a nursing career and thinks he may attend college evening classes.

Mr. Katzer said, "There are over 150 former Dispatch Department trainees who have been transferred and are employed in other hospital departments in skilled and highly technical jobs, and many others who have gone out into the community and on to a college education. For the first time in the lives of over 200 of our student-employees, they have been given an opportunity to think positively and confidently. While performing a vital service for the MGH, they are helping themselves to a productive life."

A Year of "Recycling" to Improve Patient Care

Dr. Hershal D. Collins has been an MGH Assistant Resident in Medicine twice. The first time was 20 years ago, when fresh from Harvard Medical School, he came to the MGH for a three-year residency in medicine. The second time around – this year – he left a busy private practice for a year's "recycling and renewal."

In between he managed to practice medicine in two of the furthest reaches of continental United States – Alaska and northern Maine. The two years after his first residency were spent in the Public Health Service caring for Alaskan Indians and Eskimos.

A native of Caribou, Maine, Dr. Collins then returned to his home town (its population of 8,500 is only a little larger than that of the MGH) and established a practice in internal medicine. When he left 15 years later to return to the MGH for "recycling," he estimated that 2,400 people considered him their primary-care physician.

About 30 doctors and three community hospitals provide health-care services to the 60,000 people of the central Aroostook area of northern Maine. Fifteen years ago there were only 12 physicians.

"That figure [30 doctors] includes the radiologist, pathologist, and anesthesiologist in each hospital," Dr. Collins said, "so that primary-care physicians are really quite scarce.

"An opportune time came for me to leave for a year because we'd been trying to get a new internist to come to the community, and one came just a short time before I left. There has been an influx of several physicians since then, and I think the coverage has been good. They still seem to want me to come back, though," he added.

The chances that family, professional, and financial obligations can be worked out to enable most physicians to plan for a year away are too difficult, Dr. Collins thinks. With a son away in college and his daughter just beginning high school, his own transition was easier. He rented his home and office in Caribou and rented the Belmont home of a physician friend who was abroad on a sabbatical leave.

"I chose the MGH because I could go back and have enough associations and know enough people to make it easier for me to fit in for a year. Also," he said, "the training there is the best."

Dr. Collins is no stranger to the continuing education that a physician needs to bring up-to-date care to patients. He has been active in Maine's Regional Medical Programs begun under former President Lyndon B. Johnson to bring advances in medicine to practicing physicians in rural areas.

"Continuing physician education was part of the emphasis we've had with our program," Dr. Collins said. "But

Sylvester L. Jones, work-study student, delivers laboratory specimens.

being 20 years out of medical school and 17 years out of the MGH, I felt that I had probably missed some significant changes that have occurred in that time even though I read, attend professional meetings and lecture series, and try to keep up.

"I thought that by going back to that period of my training where the learning curve was the steepest, mainly the second [assistant resident] year, I would actually change my pattern of practicing medicine."

Dr. Collins acknowledges that the MGH has undergone many changes since he left in 1955.

"It seems so much bigger," he said, "but not just because I come from a small rural area. There are actually many more backup people working here now in different areas. Even the medical house staff has grown from 12 interns and 12 assistant residents to 18 of each.

"For oxygen therapy, for example, there used to be just two people. If we needed the Emerson respirator [iron lung], they would bring it up from the bowels of the hospital through the corridors to wherever it was needed. There was no Respiratory Therapy Department [*MGH News,* Dec. 1972] or any of the technicians or equipment we have today. Whenever a patient needed any type of oxygen therapy, either one of the two therapists or the nurses did it.

"Management of the patient with respiratory failure has markedly changed. One of the reasons I returned to the MGH was to update myself in that area, as well as to improve my proficiency in certain cardiac problems.

"Cardiac monitoring of all types was nonexistent before. Bulfinch 3 [an area in the Bulfinch Building] was the only intensive-care unit where an acutely and severely ill patient could obtain highly specialized care. Now there are nine specialty intensive-care units throughout the hospital."

With the increase in hospital personnel providing expert services, however, some of the close-knit sense of community the MGH as a smaller institution fostered in those who trained and worked there has diminished, Dr. Collins feels.

"When I trained here before, all the house staff knew each other," he said. "We all ate two or three meals in the cafeteria together. Medical house officers here now may not know half of those in other departments."

Dr. Hershal D. Collins as a resident the first time around

When asked how fellow house officers reacted to working with an assistant resident who had had the benefit of 15 years' experience in private practice, Dr. Collins said that they overcame their initial reservations and they "got along fine." He added, "I think that they recognized that I have a little different approach to patients than they have.

"I'm not as anxious about some of the possible problems the patients may develop, and I am more willing to treat what is going on and then face the complication when or if it occurs.

"We didn't have quite as many diagnostic tests available 20 years ago and we didn't use them quite as much as they are used now. Much of the laboratory work done here is to anticipate or rule out problems, and it may make medical care more expensive at the MGH, but it also makes it awfully good."

As medical-care costs have risen sharply over the past 20 years, hospital house staff and employee salaries have kept pace. The intern's salary in 1952 was $25 a month. Dr. Collins earned $100 a month in his third year of training. Interns at the MGH now receive $10,900 yearly.

Had his original training at the MGH prepared him well to run a private practice as a primary-care physician? Dr. Collins unhesitatingly answered, "Yes."

The physical and mental demands of an assistant resident, who works as long as 36 straight hours, are not any more arduous for Dr. Collins than the stresses of a private practitioner.

"In a private practice you are responsible for patients day in and day out," he commented. "When the end of the day comes, you are still concerned about these people and still trying to solve their problems.

"You are just as concerned while treating patients at the MGH, but when you leave at the end of a long day, you know that other physicians are providing good coverage until you come back. The continuing responsibility of a private practice is off your shoulders and that compensates for the fact that you may have to stay up all night to work."

In spite of long hours, however, Dr. Collins thinks the year of "recycling and renewal" has been very rewarding.

"To have the tremendous spectrum of disease laid out before you, organized so that you can learn from it and understand it all at once, made it well worthwhile to come back," he said. "In a practice associated with a small hospital, I might see one patient with Cushing's disease in two or three years. At the MGH, which is a referral center for such complicated diseases, three such patients might be admitted in one week. You have a chance to think and learn about them and observe how they are studied and treated."

Has he ever regretted practicing medicine in a small town? The quality of life in Caribou and those patients who depend on him for their health care beckon Dr. Collins to return.

"Everybody has his thoughts that other pastures are greener," he said, "but the rewards of going into practice in a small town are many, and the chances to pattern your life the way you want it are much greater there than in a large hospital or big city."

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Work Plus Study Spells Success for Students

For seven years the MGH Dispatch Department has quietly pioneered a work-study program in cooperation with the Boston Public Schools. Students, many of whom were potential dropouts with poor attendance records in conventional junior and senior high school programs, receive on-the-job training and experience at the MGH while completing their high school education.

"The Dispatch Department," Leon F. Katzer, its Director, said, "provides a centralized manpower pool of semiskilled personnel. When establishing this centralized service, we had to have people with an interest and motivation for working in a hospital. We could train them quickly to give us the flexibility to use them as backup for a comparable level of personnel anywhere in any department.

"Daily and weekly we rotate all our people on different job assignments, so they become flexible. This is the only department that reaches into almost all other departments in the hospital. They know a little about every unskilled and semiskilled job operation."

In any one day a work-study trainee might transport patients via wheelchair or stretcher, carry blood from the Blood Bank to the operating rooms, or transport surgical and patient supplies, laboratory specimens, medical records, X-ray films, pharmacy supplies, mail, or other equipment.

He might be assigned to departments, such as Medical Records or Radiology, where in addition to delivery duties, he is trained to file or pull patient records or assist technicians in developing X rays.

When the work-study program began in 1966, the MGH was the first hospital and one of the first organizations to participate. From the original 12 students who then began working in the Dispatch Department, the numbers have now swelled to 35. In addition, 11 students are assigned to the X-ray Scheduling Office, under its Supervisor, Miss Terry Fitzpatrick.

They work in teams, with one team member assigned to mornings and attending Boston High School on Newbury Street in the afternoon, and the other student reversing the schedule. Although the school is in session 180 days a year, pupils are committed to their jobs during school vacations as well.

Harvey L. Simons, Assistant Director of the Dispatch Department and student supervisor, sees the work-study program as beneficial not only to the hospital but also to the students.

"They learn a sense of pride in themselves for holding down a responsible job," he said, "and often provide additional financial support for their families. In the few instances when a student hasn't worked out, it is because his attendance and punctuality records have been poor, not because of job-related problems. One young man, the oldest of several children, was totally responsible for the care of his younger brothers and sisters and found it impossible to continue working."

Miss Fitzpatrick, whose major responsibility is scheduling over 250 in- and outpatient X rays each day, depends upon the students to transport patients to and from the Radiology Department.

"I am very impressed with their reliability and their attitude," she said. "They are very concerned about the patients and do extra things for them above and beyond their duties. One Spanish-speaking student helps translate and assists when we have a patient who doesn't speak English."

Dennis Willis, a 1972 graduate of

(Concluded on Page 6)

Harvey L. Simons, supervisor of Dispatch student-trainees, gives delivery assignments to Mrs. Nilda Amador and Miss Maria S. Quarato.

MGH News

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That Darn Nobel Prize Keeps Getting in the Way

Mystery Rash: Doctors Get the Picture

Those minutes might have been hours.

To reach the MGH's Logan Airport Medical Station and return, two MGH specialists might have wasted an hour, or even two, to scramble through the snarl of downtown Boston traffic. They could have gone through the frustrating ritual of getting to their cars, parking them at the airport, and making their way to the clinic. Only then could they have examined the patient.

But once again, the MGH's closed-circuit telemedicine link turned the tables. At the same time, it may have helped prevent the spread of a strange disease.

While the ailment itself is not generally a cause for alarm, the incident dramatizes one aspect of telemedicine's promise. [Editor's Note.]

The man before the telemedicine camera at Logan was 31-year-old Paul A. Riessle, a TWA mechanic from Tewksbury. He had a serious rash. Its yellow blisters dotted the reddened patches of skin on his feet, buttocks, and sides of his hands opposite his thumbs. Mr. Riessle had a fever and had just recovered from a sore throat.

Four miles away the mechanic's crisp black and white image appeared on the monitor in the teleconsultation room at the MGH.

With Mr. Riessle at Logan was Dr. Kenneth T. Bird, Director of the MGH's Teleconsultation Service. At the other end of the linkup was Dr. Thomas B. Fitzpatrick, Chief of the MGH's Dermatology Service.

Dr. Fitzpatrick wasn't sure about the rash. He thought he recognized it. Even before Dr. Fitzpatrick saw Mr. Riessle, Dr. Bird had mentioned the rash on the patient's hands. Disorders which produce that kind of rash are rare. That was a clue. Dr. Bird had described its color to him. The rest, the close-up camera showed. And this camera, which even allows the viewer to distinguish the pores on a man's skin, clearly showed the oval-shaped blisters on Mr. Riessle's hands.

Dr. Fitzpatrick hesitated. If the rash was what he thought, the Tewksbury man should have blisters on the roof of his mouth. There were none.

But the Dermatology Chief knew he had a man on his staff who is an expert on the illness. He picked up the phone and dialed Dr. Martin C. Mihm.

(Continued on Page 2)

Storrow Drive often looks like this when physicians at the MGH and patients at Logan Airport try to get together. But see picture on page 3 . . . .

When the MGH Scientific Advisory Committee held its first meeting 25 plus years ago, one member failed to appear.

But Dr. Carl F. Cori had a good excuse. He was in Stockholm picking up a Nobel Prize. Recalls David C. Crockett, a member of the hospital administration who witnessed the committee's birth:

"It became traditional because of the Nobel Prize that December is a bad month for the Scientific Advisory Committee. Somebody always had to go to Stockholm to accept his award."

If Mr. Crockett exaggerates, he takes only mild poetic license. Since the first meeting in 1947, 12 persons have won the Nobel Prize either before, during, or since their service on the committee: Linus Pauling, Sir Peter B. Medawar, Sir Hans A. Krebs, Sir Howard W. Florey, Arthur Kornberg, Salvador E. Luria, Carl F. Cori, Herbert S. Gasser, Charles B. Huggins, Severo Ochoa, Fritz A. Lipmann, and Edward L. Tatum.

Dr. Lipmann was an MGH scientist when he won the prize, and Dr. Cori became one later.

Other Scientific Advisory Committee members were world-famous men like Rene J. Dubos of the Rockefeller Institute, Karl T. Compton, James R. Killian, and Howard W. Johnson, all presidents of M.I.T.; and W. Barry Wood, Jr., as famous in medicine as he was on the Harvard University football team.

One of the persons working most closely with the Scientific Advisory Committee has been former M.I.T.

(Continued on Page 4)

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EDITORIALS:

Twenty-five Years of Obscurity

The hospital's Scientific Advisory Committee, described in a page 1 article, has met over a period of 25 years without the general public being aware that it exists. When you consider the fame of many of the members, 25 years is a long time for that body to remain unknown.

Within the hospital the matter is quite different. Since the birth of the committee, those in the MGH scientific community have been actively involved with it. Only because the committee has labored without publicity ever being sought for it has the general public been unaware of its existence. Many of the greatest names in world medicine and science have been content to toil unobtrusively for the MGH advisory group, receiving little more than the gratitude of the institution. In an era when mankind has a reputation for selfishness, it is gratifying to see a display of selflessness.

Instant Expertise

The columns of this publication have dealt with telemedicine before. And chances are they will again. For this system, christened at the MGH, has the potential to resolve some of the problems of uneven manpower distribution that have been plaguing medicine.

The article on page 1 of this issue provides an outstanding example. A physician, a generalist, at the MGH Logan Airport Medical Station appeared with a patient who had an unusual rash. At the MGH console the Chief of Dermatology thought the rash was caused by a little-known disease. But the lesion was somewhat uncharacteristic. To be certain, he had a leading expert in the viral ailment in question walk over to an MGH telemedicine camera to examine the patient at the airport. Diagnosis confirmed. Elapsed time: five to ten minutes. Depending on traffic, a round trip by car to the airport medical station consumes from 30 minutes to two hours. The incident demonstrates clearly one aspect of telemedicine at the MGH: the ability to select from a vast arsenal of experts on any specialty and a wide variety of subspecialties and have them "present" to diagnose and treat patients at Logan Airport or the Veterans Administration Hospital, 25 miles away in Bedford, Mass. The same principle can be applied to other large medical centers. And telemedicine networks can be extended to remote areas which have very limited access to physicians.

Children Vulnerable To Mystery Rash

(Continued from Page 1)

An elevator ride and a few corridors away, Dr. Mihm left at once. In five minutes, he was there. He examined Mr. Riessle – via telemedicine, of course. Yes, he confirmed, it was what Dr. Fitzpatrick had suspected. It was the painful and contagious "hand, foot, and mouth" syndrome. In this case, as occasionally happens, no mouth rash occurred. But hand, foot, and mouth it was.

This syndrome, transmitted by a virus, usually Coxsackie A-16, can cause minor epidemics. It can be disabling for a few days.

Mr. Riessle first noticed the rash on Friday, July 20. He had welded all day at work. His hands and feet began to ache. In the weeks before, the medical station at Logan had treated him for conjunctivitis, or "pinkeye." The thin, clear layers which covered his eyeballs had been inflamed. He felt the pinkeye and welding had somehow caused his rash. But they hadn't.

On the following Monday, Mr. Riessle arrived at the medical station. Dr. Fitzpatrick saw him as part of what started out to be a routine afternoon at the weekly teledermatology clinic.

When Drs. Bird, Mihm, and Fitzpatrick discovered what Mr. Riessle had, they tried to determine how he caught it. Since hand, foot, and mouth occurs mainly among children, they asked him about contact with his family.

"He had been to a family gathering, within two days of his coming to the telemedicine clinic," Dr. Mihm reported, "but this was not sufficient time for the incubation period of the disorder."

The doctors found, however, that the Riessle family had shared a swimming pool with neighbors. Many children swam there. Mr. Riessle's two-year-old nephew had come down with a rash and fever. But the three physicians couldn't be sure that this was the way Mr. Riessle had picked it up.

As Dr. Mihm points out, hand, foot, and mouth syndrome can occur in isolated cases.

Finally the doctors prescribed medicine for Mr. Riessle's fever. No cure is known for the rash or the syndrome

itself. They advised him to stay out of work for a few days.

The syndrome the young mechanic had contracted, according to Dr. Mihm, was considered rare until about 15 years ago. Because he is an expert in the disease, Dr. Mihm indicated he now sees four or five cases every spring and fall at the MGH.

Although there have been several epidemics of it over the years in New England, Dr. Mihm advised that such outbreaks are infrequent. The only recent one, he stated, occurred in Worcester, about a year and a half ago. There six persons had the syndrome.

Dr. Mihm first became interested in the hand, foot, and mouth syndrome when he worked in the Public Health Service on Staten Island, New York. There, he said, "We evaluated 120 patients with this disorder. These patients were located at the Governor's Island Coast Guard Base. As we traced the spread of the disease, we discovered that the illness was apparently transmitted to Governor's Island by a visiting family from Maine. The epidemic became widespread because of a birthday party attended by about 25 children. Most of them contracted the syndrome, and so did several of their parents.

"It's really transmitted by an anal-oral route," Dr. Mihm explained. "The virus is excreted, or passed fecally, and that is why children, with whom hygienic conditions are not always optimal, can transmit it from one to another.

"Apparently it can also be transmitted by oral-oral contact, as, for example, kissing between adults.

"The patient usually has a short duration of fever and malaise," Dr. Mihm said, "and then notices blisters, which last anywhere from a few days to two weeks."

Hand, foot, and mouth syndrome can recur in a person up to six months after the first attack. Between bouts patients carry the virus and may be a source of infection to others.

Aside from the illness Dr. Mihm was struck by another aspect of this incident, his first encounter with telemedicine.

"Theoretically," Dr. Mihm said, "a doctor hundreds of miles away could get expert opinion in minutes with the use of telemedicine."

Dr. Bird is also excited about the episode itself. He calls it, "a great patient care and teaching adventure."

Sickle Cell Anemia: Much Misunderstood

A combination of social, political, and medical interests have zeroed in on the disease sickle cell anemia during recent years. In part this rising concern and attention have outstripped the availability of medical facilities and experts who can provide accurate information, treatment, and counseling. As a result, some misinformation and many questions about both sickle cell anemia and sickle cell trait have arisen. This article examines various aspects of the disease. [Editor's Note.]

In May, the MGH opened a Sickle Cell Screening Unit under the direction of Drs. Richard W. Erbe, Assistant Pediatrician and Assistant in Medicine, and John T. Truman, Associate Pediatrician.

Funded partly by a federal grant from the Sickle Cell Disease Branch of the National Heart and Lung Institute and partly by the MGH Committee on Research, the new unit will serve as a guide for others to develop screening and counseling techniques. This pilot project will also be a source of valid information about the disorder, and a facility for free, voluntary testing and counseling for MGH employees and their families.

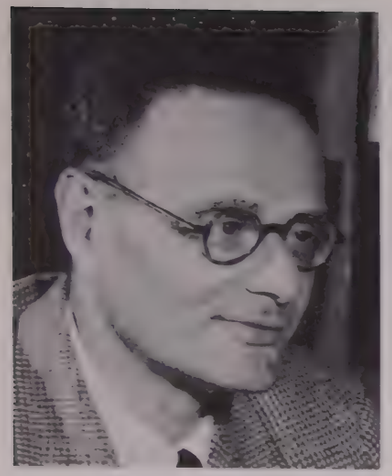
In addition, Mrs. Connie Jarvis, coordinator of the unit, is working with

(Continued on Page 6)

Telemedicine brings doctor and patient together without time lost to traffic. Via close-up camera, Dr. Thomas Fitzpatrick, Chief of Dermatology, on the monitor at the MGH, examines a skin disorder on the patient's foot. The lesion, as shown on the lower screen, is smaller than the nickel beside it.

Scientific Advisory Committee: A Breadth of Understanding

Half of the 12 Nobel Prize winners who have served on the MGH Scientific Advisory Committee



Sir Hans A. Krebs
(From mid-1950 picture)

(Continued from Page 1)

Professor Francis O. Schmitt, a member of the hospital's Board of Trustees. Professor Schmitt observed:

"The fact that so many of the Scientific Advisory Committee members have won Nobel Prizes is in itself an indication of high caliber. Many Nobel laureates are so specialized in their given fields that they are quite restricted in their expertise. However, the breadth of understanding of the Nobel list of the Scientific Advisory Committee has been very broad indeed."

Designed to advise the Board of Trustees, the committee evaluates the quality, quantity, balance, and direction of research activities at the hospital. By predicting trends it enables the MGH to begin important programs long before they become accepted nationally.

It was in 1947 that the committee was born. Dr. Edward D. Churchill had urged its creation to buttress the lay trustees charged ultimately with deciding the use of research funds.

Composed entirely of persons outside the MGH (Dr. Lipmann served after leaving the hospital; Dr. Cori joined the hospital after serving as did Dr. Seymour S. Kety, another former member), the six-member committee traditionally includes one member from Harvard University, one from M.I.T., and four from any other part of the world. Each person serves on a three-year staggered-term basis.

With the appointment, also in 1947, of Professor Schmitt to the Board of

Carl F. Cori

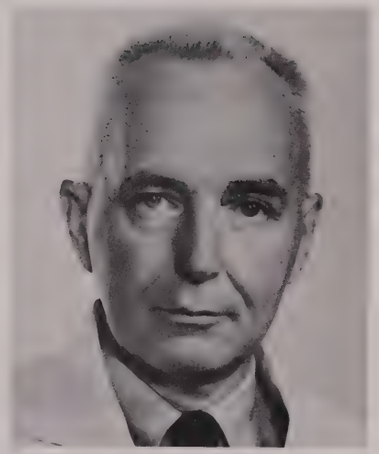
Trustees, the trustees gained a world-renowned scientist who acted as a liaison with the hospital's research community and the Scientific Advisory Committee itself. Phillips Ketchum and Francis C. Gray, two other former trustees, also maintained close contact with the hospital's research community. In fact, Mr. Gray was Chairman of the Board of Trustees when the committee was formed.

The Scientific Advisory Committee deliberates over a two-day period wrestling with questions posed by the hospital's Committee on Research. The resulting report goes to the Board of Trustees which sends it to the Committee on Research for comments.

As a result of the various stages of deliberations, MGH scientists and trustees know one another in a way never before possible.

Presentations made to the Scientific Advisory Committee by hospital researchers often become animated. One scientist so flailed his arms during his talk that he became entangled in a curtain and tore it down.

But weighty decisions rather than levity have predominated through the years.

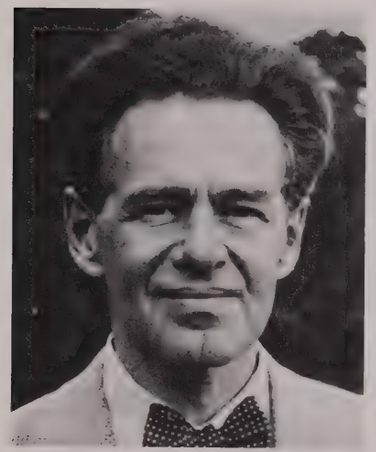


Charles B. Huggins

At its very first meeting in 1947, the advisory committee confronted several pressing issues. Research funds were drying up rapidly, and new sources became mandatory. But where to find them? Specifically should the hospital accept money from such groups as the federal government's National Institutes of Health?

A number of MGH scientists wondered aloud whether the hand that feeds might also stifle. After weighing the question, the Scientific Advisory Committee responded:

"We believe that it is proper to solicit and accept federal funds in support of the research programs of the hospital," as long as they are not accepted "under conditions which would



Fritz A. Lipmann
(From early 1950 picture)

impair the control and freedom which are essential to the successful continued operation of an independent hospital. Finally, the more outstanding the research accomplishments of an institution, the greater will be its ability to attract financial support and its power to resist encroachments of its proper freedom."

Extension of the MGH research role was also advised. Some 15 years later the committee was to report that the subsequent expansion of the hospital's research program had stimulated a significant improvement in the standards of patient care and teaching.

In addition the first report urged the acquisition of considerable research space. The hospital transformed the

Edward L. Tatum

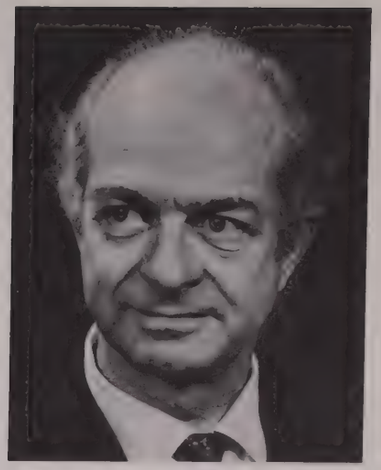
suggestion into a research building dedicated in 1951.

As a result of recommendations made by the 1948 Scientific Advisory Committee, the hospital established research units in cardiovascular disease and infectious disease. One recommendation made by the 1952 committee anticipated by more than 15 years the furor about classified research that has gripped the nation in recent times:

"The contributions that can be made through research are necessarily diminished if there is present in the research laboratory a restriction on the completely free dissemination of information among the research men, and the prosecution of classified work would be expected necessarily to interfere with the main work of the hospital." The hospital has carried out the recommendations of the committee that classified research work not be conducted in the MGH.

In 1959 the Scientific Advisory Committee's discussions about radiation therapy and research foreshadowed the Cox Cancer and Radiation Therapy Center now under construction.

And so it has gone. A number of units and programs here flowered after



Linus Pauling
(From 1958 picture)

germinating from seeds of ideas planted by the committee: the establishment of a strong program in genetics, for example, long before most hospitals. Such achievements have come from the committee's ability to anticipate trends.

In its latest report the committee warned of the erosion of federal support for medical research and urged:

"The MGH should therefore not be content with a reaction of acquiescence and adaptation. As the premier teaching hospital in the United States, it has an obligation to speak out on issues which affect the health of the American people."

That report was the committee's 25th. Has the group outlived its usefulness? A subcommittee headed by Dr. Paul C. Zamecnik of the hospital's Committee on Research explored that question recently and decided:

"It would seem inappropriate and retrogressive to allow to disappear such a valuable means of obtaining objective advice from eminent outside scientists."

Professor Schmitt agrees that the visionary Scientific Advisory Committee continues to fulfill an important function despite "the high firing power [of scientists] within the MGH ranks itself.

"When you bring creative scientists of high caliber together, you create an entity which results in something more than the sum of its parts. And that is what happens with the Scientific Advisory Committee. When the members debate matters, they come up with ideas that perhaps none of them would have thought of alone."

Sickle Cell Anemia: Much Misunderstood

(Continued from Page 3)

Dr. Erbe to develop a pamphlet to be used in sickle cell anemia counseling. Miss Beverly Y. Brooks, RN, of the Nursing Staff Education Department, and Dr. Erbe are holding discussion meetings, open to the MGH staff, on the disease itself and the functions of the screening unit.

Sickle cell anemia is not a newly discovered disease. It was first described in 1910 when Dr. James B. Herrick of Chicago published a case report of a 20-year-old West Indian student with severe anemia and peculiar, elongated red blood cells.

In 1922 Dr. Victor E. Emmel reported that normal-looking red blood cells from a similar patient changed shape when deprived of oxygen. He named the disease "sickle cell anemia" because of the resemblance of some of the odd-shaped cells to a farmer's sickle.

During that decade it was also observed that the disease ran in families, but it was not until 1949 that Dr. James V. Neel, a geneticist, identified the precise inheritance pattern of sickle cell anemia. He found that the disease results when a person has inherited a particular pair of genes, one from each of his parents. (Genes are the factors within cells which transmit a person's hereditary characteristics.)

Someone who has inherited a sickle cell gene from only one parent and a normal gene from the other is said to have sickle cell trait. Although the health of a person with this trait is not significantly affected, he or she is a carrier and can pass it along to offspring.

Through the discoveries of Dr. Linus Pauling, and later, Dr. Vernon Ingram, sickle cell anemia became the first inherited disease in which a defective molecule was precisely identified. In sickle cell anemia there is a defect in a pair of genes that program the manufacture of hemoglobin. (Hemoglobin is the substance in red blood cells that carries oxygen to all body tissues.)

That incredibly minute defect in the hemoglobin genes is enough to set the stage for a chain reaction which ultimately causes the normally disc-shaped red blood cell to assume a sickle shape when the cell's oxygen level becomes too low.

The genetic defect involved in sickle cell anemia began long ago by mutation, a process of change in hereditary material. However, many scientists believe the sickle cell gene reached its present high level of frequency by providing individuals with sickle cell trait some protection against a form of malaria found primarily in Africa, Greece, India, and the Middle East. Thus, those with sickle cell trait were more likely to survive malaria and bear children.

The genes for sickle cell anemia were brought to the United States and the Caribbean by the slaves taken from Africa. Anyone of African ancestry or, less often, of Mediterranean or Middle Eastern descent can carry the gene for sickle cell anemia.

The fact that nearly all of the estimated 50,000 Americans who have this disease are black is the end result of the effects of malaria, geography, and the slave trade, and not race itself. In other countries, sickle cell anemia occurs predominately in Caucasians.

"Sickle cell anemia is the most frequent recessively inherited disease in the U.S. today, regardless of race," Dr. Erbe of the MGH Genetics Unit said. "It is more prevalent in this country than other inherited diseases such as hemophilia, cystic fibrosis, Tay-Sachs disease, or phenylketonuria [PKU].

"Because there is no cure at present and no completely effective treatment, genetic counseling as a form of preventive medicine fills an essential role in our approach to the disease."

One in every 625 black babies that are born in this country has sickle cell anemia. Present estimates suggest that such a child has only a 50 percent chance of living until the age of 20. Few survive beyond the age of 40.

Top photograph shows red blood cells in the presence of adequate oxygen from a patient with sickle cell anemia. Bottom picture shows sickled red blood cells which appear following the removal of oxygen.

Children who inherit the disease usually have no symptoms during the first six months of life. Anytime thereafter they may require repeated hospitalization for periodic bouts called crises, any one of which can be life-threatening.

The most common type is the thrombotic crisis which results from blockage of tiny blood vessels by sickled red blood cells. The result is swelling

Mrs. Connie Jarvis and Dr. John T. Truman examine the results of a process called electrophoresis. Only a small blood sample is used to distinguish whether a person is a carrier.

and severe pain in oxygen-starved tissues. Such a crisis is produced by increased demands of the body for oxygen, as in sudden overexertion, any serious illness, or at high altitudes where the amount of oxygen in the air is reduced.

Another type of crisis, common to young children, occurs when the spleen (an abdominal organ) suddenly accumulates vast amounts of blood. Unless treatment is prompt, the outcome can often be fatal.

The life-span of the red blood cells of a person with sickle cell anemia is only one-third of normal. Although the bone marrow works to compensate for the increased destruction of red cells, sometimes it cannot maintain its high output. The result is an aplastic crisis.

In a hyperhemolytic crisis, an infection can trigger a sudden further increase in red blood cell destruction.

Symptoms and signs of sickle cell anemia vary in type and severity. Individuals with the disease often have attacks of severe pain in the arms, legs, back, or abdomen. They are much more susceptible to infections, with pneumonia the leading cause of death in this country.

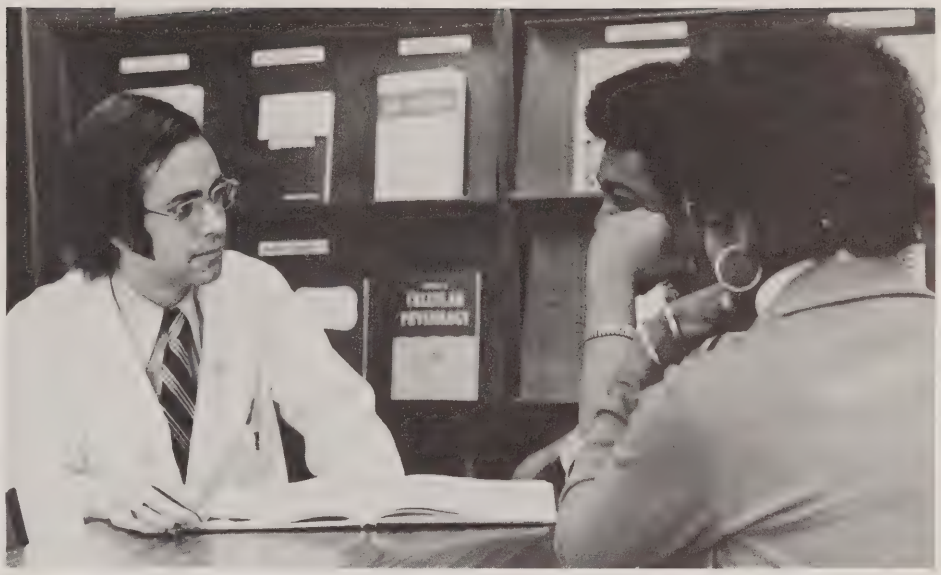
The liver and kidneys may be seriously damaged. Ulcers which respond poorly to treatment may develop on the lower legs. Adolescents have a slowed growth rate, and the development of secondary sex characteristics can be delayed.

The health of the two million American carriers of sickle cell trait, on the other hand, is unaffected except under very unusual conditions, such as mountain climbing above an altitude of 12,000 feet. Unless tested specifically for sickle cell trait, most of them are unaware that they are carriers.

Sickle cell trait can never develop into sickle cell anemia, nor can either condition be "caught" like measles, influenza, or venereal disease. Outside factors (such as diet, environment, or other illness) do not influence the chances of a child being born with the anemia or trait.

Specific blood tests are available to detect sickle hemoglobin. A process called electrophoresis, using a small blood sample, can distinguish whether a person is a carrier. This test is available free of charge in the MGH Sickle Cell Screening Unit.

Some legislators, black and white, in their initial enthusiasm for accomplishing something which they thought would be positive in a health area that has received comparatively little funding or interest, urged the passage of state laws for compulsory screening for sickle cell trait.



Dr. Richard W. Erbe counsels a couple who have been screened for sickle cell trait.

It has since been recognized that screening programs require many safeguards if they are to avoid the stigma of racial genocide or abridgement of civil rights. Most health professionals think the programs should be completely voluntary and should provide for genetic counseling so that all those affected by the screening can base decisions on fact and not fear.

Although the carrier state is fairly common (one in 12 U.S. blacks), the chance of both partners having the trait is less than one percent.

But for those couples, each of their children has one chance in four of having sickle cell anemia, one chance in four of inheriting completely normal hemoglobin genes, and one chance in two of inheriting one sickle cell gene and one normal gene (thus becoming a carrier with sickle cell trait).

"The emphasis in genetic counseling," said Dr. Erbe, who supervises the genetic counseling in the MGH Sickle Cell Screening Unit, "is on informing couples, when both have sickle cell trait, of the risk to children they might have and the alternatives open to them. The idea of choice, not chance, is the basis for the concept of informed parenthood.

"The final decision as to how and even whether the couple uses this information is theirs alone to make. To this end, all screening and counseling are entirely voluntary and strictly confidential."

Since there is no way to determine if the unborn child has the disease, couples with sickle cell trait face several alternatives.

They can choose not to have children of their own and/or they can adopt children. They can delay having children until an effective treatment is discovered, or they can consider the alternative of artificial insemination.

"For those who accept the risk [a 25 percent chance that each child will have sickle cell anemia] and proceed with pregnancy," Dr. Erbe said, "each child can be tested for a hemoglobin abnormality shortly after birth. A child found to have sickle cell anemia can be given medical attention, and the parents can be instructed in early detection of infections and in avoidance of other conditions that might precipitate a crisis."

Screening and counseling also offer an advantage to a single person who carries the trait: he or she may then wish to consider selecting a mate who has also been screened and found to be free of genetic hemoglobin abnormalities.

"I think that over the next few years people will continue to become more concerned about having smaller families and providing a better quality of life," Dr. Erbe said. "And as it becomes possible to screen for the carrier states of more genetic diseases, persons of all racial and ethnic backgrounds will be directly involved. In that sense, then, we all have a stake in insuring the highest possible quality in programs such as that now being offered by the MGH Sickle Cell Screening Unit."

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The Flop That Flourished

What was originally planned as a day-care center for elderly clinics patients has undergone a surprising evolution since it opened in March 1967.

The MGH Patient Activities Center has become a "work-oriented therapeutic community," one that may be unique with this hospital. Which means it is now a beehive of activists, young and old, who contribute over 300 man-hours of service per week to the MGH, and have a lot of fun together on the side. It is open to any MGH patient.

Seventy-five to 80 regulars use the center on a continuing basis. Others drop in from time to time, usually when they are waiting for clinics appointments.

The core group includes an 84-year-old superstar who has earned a 10,000-hour sapphire service pin, and there are many others who have been awarded 1,000- and 100-hour pins.

According to Mrs. Miriam Fern, Program Director, she and project sponsors in the Social Service Department soon realized that nobody really wanted to sit around drinking coffee, playing cards, listening to the radio, and reading. This original idea was a flop. Instead, everybody wanted to work. Mrs. Fern contacted different hospital departments to see where her people could help. Center members have been kept busy ever since stuffing packets with cotton balls, rolling bandages, stuffing envelopes, stamping clinics slips, etc. When the small room gets crowded they continue their activities in the hall.

The center program is flexible enough to provide "people power" in many areas. Participants man the hospitality cart which travels throughout the Clinics Building every day. They hold bazaars and contribute the proceeds, over $1,000 a year, to the hospital. They operate a Clothes Closet which provides clothing for anyone in need, such as accident victims whose own clothing has been ruined.

Graduate students receive field service training in social work through the program. It provides a rare combination of individual and group experience. And it conserves a great deal of professional time as most participants are too busy to linger with their doctors or therapists.

For some the program has meant a return to regular paid employment after disabling illnesses or injuries. When volunteers wish, and if they prove able, the MGH tries to find them places within the hospital. A few return to work elsewhere. Several former activities center volunteers now staff the MGH's Dispatch Service.

One disabled 27-year-old man had never worked in his life when he became a volunteer. He eventually went on to work as a stock clerk for a commercial firm. The center has also become what Mrs. Fern terms a "recuperative tool."

Another man, a middle-aged widower and Master Electrician, had broken his leg. The program helped keep him going until he could return to his trade.

The Patient Activities Center is not all work and no play. Mrs. Fern helps organize outings, picnics, trips to movies and the circus, and annual events like Christmas dinner parties and anniversary banquets. Participants hire their own bus, always with the same driver, to go on outings. The group earns money to pay for them through its various projects.

In the eyes of participants, perhaps the best thing about the program is the many lasting friendships that they have formed. People who once felt out of touch and lonely now keep in touch – with life and each other. In fact, former members often return to visit when they are in town.

They work together, play together, visit ill members, attend wakes and funerals, and recently held a memorial service for a favorite friend who had died. When another friend was beaten and robbed of the $200 he was about to spend in the city of Chelsea for his food cooperative, the group rose to the occasion and replaced the money through a book and plant sale.

Somewhere along the line, the program crystallized and became a mini-community serving the larger community of the MGH itself.

Patient Activities Center volunteers put sterilized cotton balls in bags and label specimen and instrument containers. Mrs. Miriam Fern, Program Director (standing), assists.

MGH News

Vol. 32 No. 8 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS Dec. 1973 – Jan. 1974

When Surgery Is Near, So Are Mom and Dad

P. D. White—Example Is the Only Thing

His 120-pound frame resembled that of India's Mohandas K. Gandhi. His combined international fame, contributions to health, and power to evoke love were probably equaled by only one other 20th century physician, his friend Albert Schweitzer. This issue of the MGH News *is dedicated to Paul Dudley White.* [Editor's Note.]

"Example," Albert Schweitzer once said, "is not the main thing in life. It is the only thing."

Dr. Schweitzer may not have had Paul Dudley White in mind when he spoke those words. But they fit like a well-made key.

A man who, by example, taught physician and layman alike, Dr. White himself learned that way. In his own case the star which guided his life was his father. Dr. Herbert Warren White was a country doctor who practiced medicine in the city. Dedicated to his patients, he exercised self-discipline to benefit them. He also impressed this principle on the older of his two Boston-born-and-bred sons.

Paul Dudley absorbed the lesson. During one period, though, he actually despaired because of the long hours consumed by his father's self-sacrifice.

When P. D. White entered Harvard College, he decided on a career in teaching. History and the classics were his nectar and ambrosia. In his junior year he wavered and briefly switched to forestry.

A few weeks later, he discovered he preferred the human animal to vegetation. He changed to premedical courses, and his choice never faltered again. Nor did his interest ever flag.

Self-discipline helped the young Harvard Medical School graduate develop the ability to organize himself. His ef-

(Continued on Page 4)

Kimberly Young eyes part of a mural which adorns the new children's anesthesia room at the MGH. Parents can now join their child during anesthesia for minor surgery.

Surgery is never fun, but at the MGH these days, the experience is much less traumatic for children. The reason is a new program which encourages parents to remain with their child while he is being anesthetized for minor procedures.

Take Susan, for example. She has required the same surgical procedure twice – once before and once since the new program began. Each time, the 4½-year-old came to the MGH for a cystoscopy. It is a simple operation. Using a cystoscope, a special hooded metal device, surgeons examined her kidneys, bladder, and other parts of her urinary tract. Susan arrived, had surgery, and left – all in one day.

But for Susan the first experience was anything but easy.

It began two hours after her 7 a.m. arrival with her parents when she went to her operation. A nurse strapped her to a stretcher and began to wheel her away.

As she said good-bye to her parents, Susan noticed their worried looks. She began to scream. Her nurse tried to comfort her. No use. Alerted, the anesthesia team in the operating suite prepared for the worst.

By the time she reached them, however, Susan had been quieted. The masked anesthesia team hovered over her. They tried to calm her as they worked, but she remained upset and nervous. They gave her an injection through a tube, which to Susan appeared to be a rectal thermometer. This was something she was familiar with, and it did not alarm her. She fell asleep. The team gave her the anesthetic gas,

(Continued on Page 2)

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EDITORIAL:

Close to Perpetual Motion

When Paul Dudley White spoke, his voice crackled with enthusiasm and rang with authority. His blue eyes sparkled and twinkled like two stars mounted in the friendly firmament of his face. You knew you were in the presence of greatness.

Even toward the end of his 87 years, he did not walk but sprang with the lightness of his 120 pounds and the drive of an eight-cylinder engine. He was about as close to perpetual motion as one might expect ever to see.

That energy drove him relentlessly. A man who loved people, he took care of patients even while hospitalized himself with a heart attack. He carefully guided the Eisenhowers and Casals of the world past crises without ever a thought of abandoning a practice dominated by the Smiths and Joneses. But *caring* for the sick was not enough. His unbridled curiosity made him search for the source of their illness. In seeking answers as Chief of the MGH Cardiac Unit, he advanced the frontiers of the infant science. Nearly 600 scientific papers after he began, those borders were scarcely recognizable. As much as any one man he had made the infant science a respected adult.

By his example he inspired others to enter the field of medicine. Through his instruction he taught hundreds to become cardiologists who *cared* while they cared for their patients; and who themselves used scientific methods to advance knowledge. Thus in bold miniature he epitomized the best tradition of the hospital he served so well: in patient care, research, and education.

Through his magnetism he taught not only medical students but also the public. A Rod Laver playing tennis is an athlete playing tennis. A Paul Dudley White riding a bicycle was a guru. Thousands of automobile-habituated Americans rode bicycles, walked, and exercised because Dr. White said by word and example that doing so is healthy. That same charisma which could entice a sedentary population from the driver's seat to the bicycle seat charmed people from other lands as well. P. D. White could persuade an Egyptian and Israeli to collaborate at a time when their nations were threatening war. He could and did. When he attended a medical conference in Russia, he sat between Chinese and Russians like a bridge over troubled water. He also helped span the ocean between China and America. And when the first medical emissaries of the People's Republic came to the MGH, they treated him like a 20th century Buddha whom they loved as well as respected.

It would be so easy to say that he served well the hospital where he worked and the medical school at which he taught. So easy and so parochial . . . Paul Dudley White served mankind.

Snow White Watches Doctors Anesthetize Children

(Continued from Page 1)

and she was rolled into her operation.

While Susan slept, her parents, who had watched her go off in tears, waited and worried until the surgery ended.

Susan came for her second cystoscopy six months later, in April 1973. This time things had changed. Since March, Susan and some 40 other children a month have benefited from the Anesthesia Department's new program.

The procedure began when Susan was ready for anesthesia. The nurse put her on a stretcher and wheeled her away. But her parents accompanied them. They did not go to the operating suite. Instead they went to an alcove just outside it. A curtain closed it off to form a small room. Outlets in the wall provided suction and oxygen.

A mural covered one wall: In a grassy landscape dotted with trees, white picket fences, and multicolored houses, Pinocchio, Snow White, Mickey Mouse, and other children's characters romped.

Susan's parents joined her in the room. No masks are needed there. As Susan talked with her mother and father, the anesthesiologist gave her the same rectal medicine. Calm and unafraid, she drifted into sleep with her parents close at hand. As she went to surgery, her relaxed parents returned to the admitting area to wait.

The Anesthesia Department designed this program especially for youngsters age 6 and under who, like Susan, enter the hospital and leave the same day. The procedure is different for children who spend more than one day because they have time to become acquainted with the nurses and other personnel.

"Parental separation," explained Dr. George E. Battit, an MGH anesthesiologist, "is the key factor in some of the psychologic trauma associated with the hospital experience by children. About a year ago, at the behest of Dr. John F. Ryan, who was the leader of our pediatric anesthesia team, we developed a concept of having an area where a patient can be brought by his parents and gently anesthetized while still in contact with them."

This approach is finding increased acceptance in children's hospitals. Its introduction at the MGH shows what

Kim's mother and father, Mr. and Mrs. Louis Young of Cambridge, comfort her in a nervous moment. The 5-year-old awaits medication to put her to sleep.

an important role it can play at a general hospital as well.

The key is the new induction room. It allows patients and parents to enter an anesthesia area without masks or operating-room clothes. The colorful mural, the work of operating-room clerk Miss Mary Egan, is not essential, but it helps the anesthesiologists.

"I come in and can start to talk to the figures depicted on the mural," Dr. Ryan explained. "By not directly confronting the child, the youngster is not immediately placed on the defensive. The patient can join with me."

The new induction area is only the first half of the Anesthesia Department's plan for its young patients. Before surgery children often have to sit for four or five hours in what Dr. Battit calls "a very boring situation."

To keep youthful patients content, the hospital is constructing a new waiting room, which will feature toys and children's decorations. Next door a new sleep-off area is being completed. After surgery children must first go to the recovery room. From there they will be able to get extra rest in the new sleep-off room, where parents can be with them.

Though designed to aid children, the new program can help their parents also. Contrast the effect on Susan's parents awaiting her first and second cystoscopies. The second time they had seen her go to surgery unafraid.

Dr. Ryan, also Assistant Professor of Anesthesia at Harvard Medical School, described how people sometimes face their offspring's operations: "The mother is told the child needs a hernia repaired. She goes home. She has had a bad experience in 1937 when she had a tonsillectomy, and she remembers how terrifying that was.

"Her child asks her about the doctor. She starts to explain and tells him he's got to go to the hospital, but everything's going to be fine. Then the mother goes to the phone and dissolves in tears to her sister. And the child, who is no dummy, thinks, 'Wait a minute, Mommy tells me it's OK. Yet it's very bad.'

"The parents' emotional preparation of the child makes it almost impossible to establish rapport with him during the preoperative visit."

Parents, Dr. Ryan feels, must be prepared for their child's operation. If readied, they can not only help him through the hospital visit but also can make it easier on themselves. For parents and child, the visit can be much more than an experience to forget.

"We have mothers," Dr. Ryan relates, "who, as soon as their child lies down to sleep, say, 'He looks so beautiful.' That's beautiful. It's something to share – that she loves her son so much.

"The same goes for the big blustery father whose daughter is the apple of his eye. Seeing her fall asleep and realizing that she's going off to an operation are things that mean a lot to parents. Thus they have contributed a great deal to their relationship with their child. And this will have benefits through the years."

Beyond the world of young patient and parent, the new program is part of a trend in surgery. Hospitals are operating on greater numbers of children, as well as adults, who can be discharged on the same day. The MGH is an important part of this movement. And it will continue to be, according to Dr. Marshall K. Bartlett, member of the Senior Consulting Staff in Surgery at the MGH and Clinical Professor of Surgery Emeritus at Harvard Medical School. This trend will save expense for both the MGH and its patients.

In the future, Dr. Ryan believes, up to half of children's surgery will be ambulatory. That is, they will be able to leave on the same day. Among ambulatory surgical patients, children have always outnumbered adults.

Dr. Ryan feels that balance will persist. His reasons? Children commonly need only simple operations and recover faster than do adults. Surgeons now perform about one fourth of children's surgery in the ambulatory mode.

Because of this trend, the new anesthetic procedure at the MGH is expected to save growing numbers of young patients from anxiety. Under old methods, said Dr. Battit, also Assistant Professor of Anesthesia at Harvard Medical School, a hospital experience "not only terrified a child for nights and years but also influenced his whole attitude toward doctors, nurses, and operations. It therefore influenced his children, and his grandchildren, and so on. Those ripples formed big waves."

With the new children's procedure, the Anesthesia Department at the MGH hopes to stop some of those waves. And it hopes to insure that no new ripples ever form.

Kim, who fell asleep holding her mother's hand, has been anesthetized and is ready for surgery.

"Nobody Could Keep Up With Him"

(Continued from Page 1)

ficiency enabled him to finish long before his colleagues the laboratory work imposed on the young MGH interns of 1911. And quality never suffered.

The story of his journey to England to study cardiology and the newly invented electrocardiograph machine has been often told. Dr. White said the machine was "viewed with suspicion by most of the doctors who had ever heard of it."

In the fall of 1914 he returned with one of those cumbersome devices and set it up in a small closet in the basement of the MGH's old Skin Ward. Neither the building nor the machine exists today. But as much as any other single event, this one signaled the birth of cardiology in America.

Dr. White ignored his former medical school classmates who scoffed at the thought of concentrating on so paltry a specialty. Perhaps the earlier death of a sister through rheumatic heart disease resolved him on his course. He founded the MGH Cardiac Unit and for 34 years never relinquished his leadership.

In 1920 he became Chief of the Medical Outpatient Department. His mission: to mold it into a superb patient-care unit.

Aside from that task, he poured almost all his energy into the infant specialty he was helping to develop. And he had a lot of energy to devote.

"Nobody could keep up with him," recalled Dr. Edward F. Bland. Fresh from medical school, Dr. Bland first met Dr. White in 1927 when the former served on the old East Medical Service.

"He and his cardiac group," Dr. Bland said, "would make the rounds in our ward every Tuesday and Friday morning at 10:30. . . . He was usually followed by a group of students, associates, and visitors. It was quite an event on the medical service."

Even then Dr. White found little time for recreation, but his energy spilled over into his occasional leisure hours. At the end of a graduate course held each year, the physicians would celebrate with a picnic.

"We'd play softball," Dr. Bland said, "and he would run the bases faster than anyone else."

In 1928 Dr. White freed himself from his duties at the MGH for one year. A traveling fellowship enabled him and his wife of four years to go to Europe. In the tranquillity of Monte Solaro in Anacapri, he wrote furiously. He called his 931-page book *Heart Disease,* and it became the definitive work on the subject.

In America Dr. White was already well known to physicians. The success of this book, his first of 12, secured his fame in international cardiology.

Aside from his year abroad, Dr. White customarily grafted his writing onto the rest of his duties. He adopted a formula of one third research; one third teaching, reading, and writing; and one third patient care.

The reading and writing came after a long day at the hospital. Often he would toil on articles until 2 or 3 a.m., rising at 6 to start all over again.

Dr. Allan L. Friedlich, who treated Dr. White, tells how the latter tried to convince him and Dr. Gordon S. Myers to coauthor a new edition of *Heart Disease.* Both younger physicians took refuge behind their heavy schedules. Dr. White protested:

"I get some of my best work done after 10 or 11 o'clock at night. You get in three or four hours of good work, and you'll be surprised at how fine you feel when you get up at 6 o'clock. Then after two or three years the book will be all finished, and you'll scarcely have noticed the effort."

Dr. White adopted the same tack when he was rewriting a book on electrocardiography. His two coauthors, Dr. Conger Williams and Miss Louise Wheeler, took turns inventing excuses why they had to quit at 2 a.m. It was only in the last two or three years that Dr. White told his wife for the first time that he felt tired one morning. He thought sleeping more than three or four hours a night a waste of time. "Too many things to do."

"It makes one wonder," Dr. Friedlich said, "whether some of the great people of the world are so driven by their desire to get things done that they can't sleep, or whether it may be that some of the people who get along with very little sleep accomplish a lot more than the rest of us."

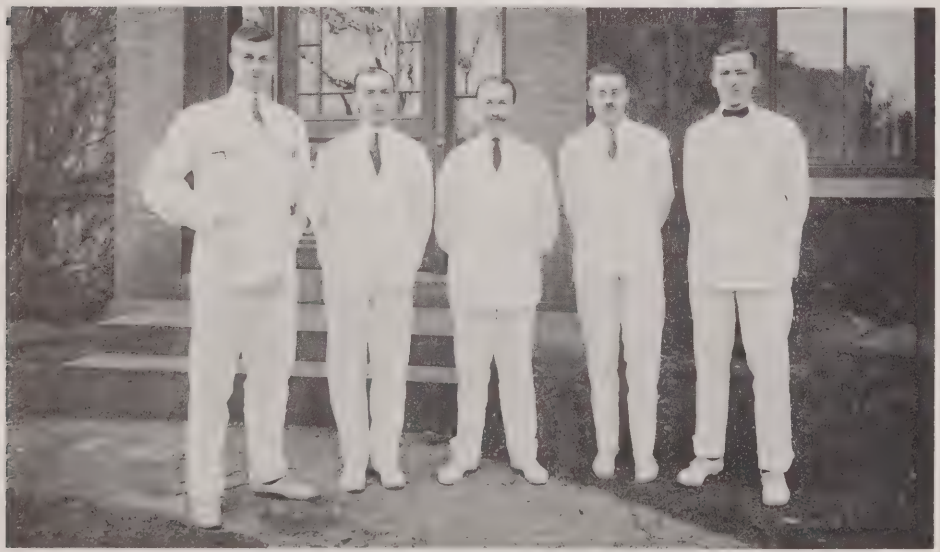
In Dr. White's case a clue may have come from his physician-brother who kept the same sort of schedule. Fate drew their genes from a line of hard-working, long-lived, and illustrious Yankees they could trace back to early America.

Much has been made of Dr. White's optimism. Deservedly so. In 46 years of close association with Dr. White, Dr. Bland never once found him depressed.

"Even under the most trying circumstances," Dr. Bland said, "I never saw him lacking in his optimistic outlook. It was extraordinary."

Cardiology was the right profession for a pioneering optimist. Most cardiologists of that period would paint gloomy scenes of semi-invalidism for their patients.

As early as 1921, Dr. White felt that his patients could be sufficiently rehabilitated to return to many years of productive work.



As a Resident in 1914, he always managed to finish his laboratory work before his colleagues. (Dr. White stands second from right.)

"One of his great contributions to the management of patients," Dr. Bland said, "was his optimism and encouragement for people to live with their heart disease rather than die with it."

This positive point of view embraced humans as well as their diseases. He expected the best from them. Because he did, most individuals strove to please him. When someone failed to support his expectations, this frailty crushed him. These great expectations are what led some to consider him naive.

During the civil rights marches of the 1960s, Dr. White publicly praised the movement. A few letters from the South condemned him, and he could scarcely comprehend the personal attacks.

"In addition to consideration and devotion to patients, he had a real love which was unequaled," Dr. Friedlich said. He lavished his devotion on the Maine farmer as well as Pablo Casals, Dwight Eisenhower, and the leaders whom he treated in many countries.

Stubborn to his last Yankee fiber, he let go of a decision only out of his consideration for others. In 1970 he suffered a mild heart attack. He insisted on holding an important meeting of the International Cardiology Foundation's executive committee in his MGH Coronary Care Unit room. His cardiologist, Dr. Friedlich, argued in vain.

"Finally," Dr. Friedlich said, "I asked him, 'How could the other members of the executive committee disagree with anything you say while you are on a monitor with an intravenous running?' Out of consideration for other people's thoughts, he agreed to postpone the meeting."

Consideration for others dominated his teaching sessions too. A busy medical teacher may remove a patient's chart and, his back to the patient, discuss the case with the surrounding students. His back still to the patient, he may leave for another bed without ever facing the patient. A former President of the Massachusetts Medical Society once contrasted this type of bedside teaching manner with Dr. White's:

"Paul White is just the opposite. He speaks first to the patient, talks to him in an understanding manner, and after making friends with him and talking to him about the character of the problem, he then picks up the chart, asks questions of the interns, and residents, and students, still facing the patient. In this way he shows that he considers the patient as an individual, and he leaves the patient with the feeling that a friend has come to help him."

A consideration and devotion to patients which was unequaled

Students, interns, and residents observed his behavior and absorbed the lesson.

"I think it's absolutely characteristic of Dr. White," Dr. Friedlich said, "that he would literally go to any ends to help a patient or do what the patient was asking him to do. This attitude of deep caring was transmitted by his powerful example to an enormous number of people whom he taught and who came under his influence. I'm sure his influence in fostering that simple kind of humanity really must be perfectly enormous in terms of three generations of teachers."

Senior physicians were also stimulated by Dr. White. In 1946 he inaugurated a postgraduate course in cardiology.

During its existence more than 250 American and foreign physicians completed the course. Among them was Army Col. Thomas Mattingly, who, like Dr. White, was called to President Eisenhower's bedside after the President's 1955 heart attack.

Dr. White believed that the average patient should receive "adequate and full information and discussion" from his cardiologist. He also stressed to students the wide range that "normality" covers. In his autobiography, he emphasized the same point by describing a study he conducted at the 1917 Boston marathon. Just before the race he recorded the pulse rates of 10 starters. The rates ranged from 60 to 118 per minute. Commented Dr. White:

"If a heart rate of over 100 had been a criterion for excluding participation in the race, we would have rejected the winner, who finished this long race easily and comfortably . . ." and with a moderate pulse rate.

Dr. White kept precise records of his patients. A feature of these was his long-term follow-up of cases.

By filling bulging volumes with these records, he was able to improve the care he rendered. He could also study the data over a period of years and extract important lessons. Often he was surprised at nature's power to heal a very sick heart.

Such meticulous attention to science translated itself into his laboratory studies. He delighted in exploring the unknown. Once Dr. Nathaniel W. Faxon, the now deceased but longtime General Director of the MGH, chanced into the autopsy room: There was Dr. White, "sleeves rolled up, in hip boots, slopping around," exploring the heart of a dead elephant and "completely happy."

"Look, Nat," Dr. White said, "it's just like a human heart – but see its size. I can put my two fingers in the coronary artery." Today the valve of that heart is at Harvard Medical School's Countway Library.

Dr. White's fascination with the elephant heart resulted, of course, from scientific curiosity. He particularly wondered whether the large heart of one man might be expected to beat slower than the smaller heart of another.

A mouse heart should beat faster than an elephant's. It turned out that a mouse heart races at 600 beats per minute. An elephant's dawdles at about 35 per minute.

(Continued on Page 6)

Even His Own Heart Became Educational Fodder

(Continued from Page 5)

Such questions led to Dr. White's much publicized quest of the whale. He never managed to take the electrocardiogram of one of the larger whales. With a smaller variety, however, he succeeded.

In 1937 and 1954 he coauthored publications about heart attacks in 100 men under age 40. These and his early support of the Framingham Heart Study did much to dispel a previous belief: that the clogging up of arteries with fatty deposits was simply a natural result of aging. It became clear that the process often affects people in the prime of life. Many consider this work one of Dr. White's most important contributions.

In all, however, he wrote nearly 600 scientific papers during the 34 years he directed the MGH Cardiac Unit and more than 100 afterward. Many were far more substantive than those that caught the public fancy. He also inaugurated three subspecialty heart clinics at the hospital.

Along with his MGH duties he was beginning to reach outward even in the early stages of his career. He had helped establish the American Heart Association in 1924. As its first treasurer, he husbanded a budget of about $2,500.

Following an idea, principally that of his MGH colleague Dr. Howard Sprague, the association later sought lay participation to guide it. As President of the organization in 1941–42, Dr. White nurtured the idea. As a result, by 1969, the budget had soared to $40 million.

In 1948 an opportunity presented itself to help shape the new National Heart Institute. After some initial misgivings, Dr. White agreed to become Executive Director of the companion National Advisory Heart Council. He would have to spend much time in Washington.

On Jan. 1, 1949, he relinquished the reins of the MGH Cardiac Unit to Dr. Bland, his former pupil. From that moment he plunged more deeply into national and international cardiology, helping to form a world organization.

Even so, at this time his fame with the lay public remained largely rooted to his New England soil. President Eisenhower's 1955 heart attack spread those roots. Overnight Dr. White became world-famous as President Eisenhower's cardiologist.

Everyone – little old ladies in Woonsocket, South Dakota, and middle-aged men in Piggott, Arkansas – demanded his services. So did the leaders of foreign countries. He continued seeing the patients who had formed his practice for many years and accepted some new ones.

With instant fame came an opportunity. As a leading cardiologist, he could command a little attention. As the President's cardiologist, he could command the nation. He exploited his fame to educate both the lay public and the physician.

In 1914 another MGH physician, Dr. Richard Cabot, had urged prevention as the first priority in heart disease. No one listened. Dr. White wrote of prevention in the 1930s. In the 1950s the weight of scientific evidence convinced him there was no longer room for doubt. Increasingly he preached the gospel of prevention.

It was a by-product of this campaign for which he is probably best remembered. Most of his life Dr. White pedaled a bicycle or strode briskly to his destination. As he promoted the role of exercise in warding off heart disease, the bicycle became his symbol.

Even in the last year or so, no Boston bicycle parade was complete without him. His slightly stooped figure, mounted on a two-wheeler, became as familiar a page 1 photograph as pictures of the governor. Television cameras whirred as his waving form pedaled up Commonwealth Avenue.

His eating habits were sometimes as much directed at public education as self-preservation. He commented that he was one of those fortunate people whose cholesterol level remained naturally normal. But in restaurants he would often inquire whether his dish contained butter or margarine. If butter, he would ask for margarine.

While he drank little milk, he enjoyed a snack-bar lunch of a cornmeal muffin and a milkshake. At his office, lunch consisted of peanut butter crackers and bouillon soup – when he stopped to eat.

Even his own mild heart attack became educational fodder. A few weeks before, he had helped prepare a heart chart for the November 1970, *MGH News*. The chart stressed the need for instant medical attention for anyone suffering a heart attack.

Most professional people who have had one prefer to squelch the news as damaging to their careers. Not P. D. White.

"We've got to make use of my heart attack," he informed his cardiologist. Soon he was telling the newspapers that he followed his own advice: He came to the MGH late at night when the telltale pain began pressing on his breastbone.

But once in the hospital he was his

Chasing the whale with an EKG (1956)

Examining Pablo Casals (1962). Mr. Casals died just a few weeks before Dr. White.

own worst patient. From bedside he insisted on supervising the care of one or two of his own patients.

In his autobiography Dr. White wrote: "The human body is truly international, and the basic rules of health apply everywhere in the world." He capitalized on that truth to foster international cooperation among physicians. One such effort was to help found the International Society of Cardiology.

He even used medicine in an effort to encourage world peace. He persuaded an Arab and an Israeli to cooperate on a joint medical study.

Piercing the Iron Curtain, he struck up relationships with Russians. The glue of this pioneering effort still holds. Late this summer Drs. Roman W. DeSanctis and Adolph M. Hutter, Jr., MGH cardiologists, attended a medical convention in the Soviet Union. Everywhere they went glasses were raised in toasts to Dr. White's health.

A rare moment of leisure. Dr. and Mrs. White in front of their cottage in Harvard, Mass.

The White magic also worked in Red China. He was one of the four original American physicians to wriggle through that nation's Bamboo Curtain.

When the first Red Chinese doctors came to the MGH, the State Department had ordered a tight ring of security for the visit. Even a specific elevator was chosen to whisk the visitors to the historic Ether Dome. But nobody reckoned on the White charisma.

He muttered something about elevators and bounded up four flights of old stairs. Like Confederate soldiers following Pickett, the uniformed Chinese marched up after him. Dr. White dominated the discussions that day the way he usually dominated conversations. But the visitors leaned forward the better to hear every word.

Before the Red China exchange, P. D. White was nominated for the Nobel Peace Prize. His nomination read in part:

"Among physicians as well as leaders in many other fields of endeavor he is recognized as an outstanding international statesman. . . . He truly personifies the role of medicine as a peacemaker. . . . His example stands as a beacon for all men of conscience and competence."

As much as the nomination itself, the support it engendered attracts attention. The famous men who backed him came from virtually every inhabited spot on the globe: from Russia, Poland, and Czechoslovakia; from Israel, Egypt, and Pakistan; from Australia, New Zealand, and Singapore; from Ecuador, Tunisia, and Germany; from Greece, Hungary, and Lebanon, to name some.

He abhorred war and liked to describe the time he examined a revolutionary with heart disease. The man asked if he could survive one more revolution. Always eager to rehabilitate, Dr. White said, "Well, maybe one more."

He said he atoned for this blight on his conscience by telling another revolutionary that his heart would not tolerate even one more revolution.

Even in his travels, he was obsessed with work. He wrote on airplanes and at airports. He took vacations to finish articles and books. So intent on his labors was he that often he returned from abroad forgetting one of his suitcases. Invariably he would reach into a pocket and discover a hotel key that his secretary had to mail back.

Frequently he would change his mind about a flight just a few hours before takeoff. So frequently that his travel agent customarily put off making reservations until 24 hours before flight time.

Because of his work pace, his outside activities suffered. He longed for the chance to read much poetry, fiction, philosophy, and detective stories; to play chess. When he conversed at an occasional party, he talked mostly of medicine and his travels.

What little free time he managed he bestowed on his wife; son, Alexander; daughter, Penelope; and four grandchildren – whom he once referred to as a loving family circle. The Whites enjoyed reading aloud in their Belmont home or their little cottage on Poor Farm Road in Harvard, Mass. His wife, the former Ina Reid, was once an MGH social worker. She understood and shared in his enthusiasm for his work.

In the last years he would periodically resolve to slow down. His secretary would nod understandably when he told her not to schedule patients. She would smile and await his inevitable change of heart.

After his penultimate illness on Aug. 13, he talked of seeing patients again. He spoke the words but never quite believed them.

Those weeks of recuperation were perhaps the happiest period of his marriage. All the time he longed to devote to Mrs. White suddenly materialized.

(Concluded on Page 8)

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Dr. White Eulogized As World Citizen

They came from the Philippines and Italy, from the South and the North, from the West and from the East. There were poor and rich, humble and prominent. There were former patients and colleagues – blacks, whites, browns, and yellows.

The occasion was the memorial service for Dr. Paul Dudley White. The Rt. Rev. Henry K. Sherrill, retired Episcopal Bishop of Massachusetts, conducted the Nov. 13 service in Memorial Church, Harvard University. During World War I, Dr. White had enlisted Bishop Sherrill in the Army and served with him in the MGH's Base Hospital 6 in France. Bishop Sherrill is also a former Chairman of the MGH Board of Trustees.

Dr. J. Willis Hurst of Atlanta, Ga., who eulogized Dr. White, was his last pupil as a Fellow in Cardiology at the MGH. Dr. Hurst, who was President Johnson's cardiologist, commented that Dr. White rehabilitated one President (Eisenhower) and indirectly another (Johnson).

Dr. Vittorio Puddu of Rome, Italy, President of the International Society of Cardiology, eulogized Dr. White as a citizen of the world.

Dr. Charles A. Sanders, MGH General Director, led a group of MGH cardiologists who served as ushers: Drs. Allan L. Friedlich, Edward F. Bland, Edgar Haber, Edwin O. Wheeler, Roman W. DeSanctis, J. Warren Harthorne, Timothy E. Guiney, Guillermo C. Sanchez, Gordon S. Myers, and Conger Williams. Chai Kambu of Thailand, a former patient, was also an usher.

Upon Dr. White's death, Dr. Sanders described him as "one of medicine's and humanity's most magnificent men." President Nixon also eulogized him.

The Last Happy Weeks

(Concluded from Page 7)

The Friday before his final stroke he felt chipper. He told his secretary to schedule one or two patients again.

That Sunday the Whites, like two honeymooners, rode around the historic streets of Lexington and Concord. They dined in the Concord Inn and chatted happily.

Early the next day, Dr. White was felled by a stroke. He was brought to the MGH but never regained consciousness. He lay in a room on the second floor of the hospital's Phillips House. Across the hall was the Coronary Care Unit. Nearby was an area devoted to research on the heart.

The skills and equipment in those rooms were a few light-years removed from a closet which once housed a primitive electrocardiograph machine. Past his window strolled healthy men and women once ill with heart disease.

But Dr. White could no longer reflect on such matters. Energy was at last ebbing from his 87-year-old body. On Oct. 31 he died.

P. D. WHITE FUND SET

The MGH has established a Paul Dudley White Fund as a lasting memorial to Dr. White.

Uses for the fund will be determined in the near future.

Preventing heart attacks. He taught by example. (1968 *Boston Globe* photo)

MGH News

Vol. 33 No. 1 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS February, 1974

Training for Medicine's Front Line – Primary Care

Parents Learn to Spur Language Growth

"Get up; close the door! Sign your name on this paper; underline your first name. . . ." Speech pathologist Jayne Jacobs rattled off a series of instructions to Major T. W. Johansson, father of a child with a cleft palate. Major Johansson promptly carried out her orders, but he forgot one step.

"I wasn't expecting so many things at once!" he protested when the other parents joshed him about his omission.

Major Johansson was seeing things through the eyes of a child. He had experienced an all-too-common problem: a difficulty in auditory memory, the amount of verbal information a person can remember in sequence and can act upon. His response suggested the treatment: the parent should simplify the instructions and make sure the child is ready to receive them.

Like the other parents, Major Johansson is the father of a youngster with a delayed development in speech and language. The demonstration took place in one of three evening counseling sessions held this fall for the first time by the Speech Pathology Unit of the MGH Language Clinic.

The sessions were planned in response to a growing frustration on the part of therapist and parent alike, and the resulting program, a free service, is believed to be the first of its kind.

"We never had enough time to talk with the parents," said Mrs. Julie Wheelden, Supervisor of the Language Clinic's Speech Pathology Unit. "They were full of questions after their child's individual therapy sessions. They wanted to delve into the problem with the therapist, to know what to do at home. But the child would naturally be interrupting. And fathers were nearly always left out."

Giving their own time, the eight young women of the staff met with the parents in three evening counseling sessions. They hoped to give the parents a chance to "ventilate their feelings." And, of course, those many questions about treatment, testing, and causes of disorders could be answered in depth.

How do children normally develop language skills? To help provide this

(Continued on Page 4)

Jessica, 4, who stutters, names objects that start with a particular sound as Gale Zoller, therapist (not in photograph), points to the pictures.

A program to train a new breed of generalist has been quietly operating at the MGH over the past seven months.

With the conviction that medicine needs to train more general physicians, a few medical centers are beginning to take this route. The ongoing MGH project, however, seems to be pursuing an original direction.

Two interns, Drs. Allan Goroll and Terrence O'Malley, are taking part in a pilot project known as "The Primary Care Adult Medical Training Program."

Their two-year course, which began in July 1973, is a new track within the Medical Services' internship and residency program.

Its ultimate goal: To improve the care of outpatients who make up the bulk of medical practice. The method: Training doctors in an ambulatory setting.

The MGH doctors who helped plan the program believe that in the future most primary-care doctors will practice as part of groups.

"In our vision," elaborated Dr. Alexander Leaf, Chief of the MGH Medical Services, "practice in the community will include groups of individuals, composed of a pediatrician, an internist, an obstetrician, a psychiatrist, and probably a dentist."

With a pediatrician available, the generalist (internist) on the team would need no special training in child care.

The MGH program is believed unique because, unlike other teaching hospital approaches, it does not seek to train "family doctors." It excludes pediatrics as a regular requirement but

(Continued on Page 2)

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EDITORIAL:

The Energy Crisis – A Dual Obligation

During the last two months the world discovered the energy crisis. Long before the Arab oil embargo, however, the threat of fuel shortages lurked. In a speech here in 1970, Dr. John Platt of the University of Michigan, in describing a myriad of problems the world would soon face, warned of impending shortages. His talk was a call for planning to head off catastrophe. Other Cassandras have been predicting for many years that America would eventually consume all its oil and other fuel. In his talk Dr. Platt presented a timetable. To prevent the fulfillment of his dire prophesies, our country had three years to launch a massive national effort. But when it comes to warding off disaster, man, the thinking animal, rarely does much better than the less cerebral quadrupeds. Our rationale? Future danger: relax; it's not immediately threatening. So why worry? Then disaster strikes: to arms; on the double; and why didn't someone warn us?

In the case of the fuel crisis, the Arab boycott sounded the alarm. The extent of the present shortage seems uncertain. Nevertheless, whether or not we seriously lack oil now, it is certain that our previous rate of galloping consumption would have eventually condemned the world to a dwindling supply. All the civilized nations were guilty of gross irresponsibility. To the extent that the boycott awakened us, it has been an unintentionally positive measure. Now we are belatedly groping to plan usage. In the process, though, we must plan wisely, not precipitously. In an attempt to be equitable the government must not, for example, restrict the ambulance to the same rules and problems as the pleasure car. Already there have been instances in which ambulances, for lack of gasoline, have been unable to transport critically ill children. At some point physicians too may be hard pressed to drive to hospitals in an emergency. Plastics – the light, disposable staple of hospitals – may fall victim to shortages of the petroleum needed in their manufacture. Government and industry should assure the medical-care field of a reliable supply – not to keep hospitals humming but to keep patients healthy.

Nor is the obligation to plan all on the side of the government. Hospitals have already begun to conserve energy. They must also conserve plastic products. Since the start of the energy crisis, the MGH has formed a committee to find new ways to husband articles made of plastics. Can they be reused? Can their use be reduced? Can linens which are also in short supply – though not because of the fuel crisis – be used in lesser quantities? This is the type of question the committee is asking. On such projects as those depends the future of our nation's health.

Team Effort Helps New Primary Unit Provide Best Care

(Continued from Page 1)

offers it as one of several possibilities in the course's optional third year.

"What we're trying to do now," Dr. Leaf said, "is to get back to the training of a more generalized internist who may not be able to cope with the latest word in each of the specialties, but who can be the kind of personal general physician most of the ills of the public require."

In a mixture of old and new, the MGH project includes elements of traditional in-hospital training, and a new, out-of-hospital internship and residency.

From July, Drs. O'Malley and Goroll – like all other interns – worked for three months with hospitalized patients and in the emergency ward.

For the middle portion of the year, their schedule calls for them to spend five months in the MGH Clinics and one at the Mathew Thornton Health Plan, a group practice in Nashua, New Hampshire.

In the last three months of their year, which ends June 30, they will return to the hospital services. Their second year will be similar. Minor details will change.

In the Clinics, the two interns are part of a team, the Primary Care Unit. This includes a secretary, two nurses, a social worker, a clinical research fellow, and a senior staff physician.

The interns participate in daily rounds for their outpatients. A visiting medical staff member and a psychiatrist attend each session. The interns discuss the care of their patients with their physician-teachers. Both the Internal Medicine Associates, an MGH group practice (see April 1973, *MGH News*), and the various special units of the medical service provide the visiting staff members.

The interns' time is divided. Some goes to specialty clinics, some to rounds, and some to the care of patients in the Primary Care Unit. Here a senior staff physician supervises them.

The Primary Care Unit forms the doctors' home base. The patients who go there now benefit from the skills and tools the interns have acquired. Nonphysician members of the health-care team, for instance, whom the doc-

Several members of the primary-care team discuss a patient who appears in the videotape on the monitor. From left foreground, Dr. Paul Heineken, Clinical Research Fellow; Drs. Terrence O'Malley and Allan Goroll, interns; Elizabeth Campana, RN; Minnie Harris, technical assistant; and Dr. J. Dennis Mull, the team's senior staff physician.

tors have learned to work with, can aid in providing maximum care.

Thus the social worker may discuss family problems with a patient. The nurse practitioner might insure that he understands his illness or takes his medications as directed.

To provide primary care, the doctors must turn to the very kind of medicine they avoided on entering the field – the specialties.

"The training," said Dr. John D. Stoeckle, an MGH physician who directs the course's outpatient segment, "is meant to teach those aspects of medicine that are applicable to the doctor's work as a general physician in a group practice."

This year Drs. Goroll and O'Malley will receive concentrated training in office orthopedics, gynecology, psychiatry, and dermatology. Next year they will train in several other specialties.

"In preparing the program," reported Dr. Stephen E. Goldfinger, the MGH physician who developed the primary-care program as a whole, "we went around to doctors in the various specialties. We asked them: 'What patients do you get as unnecessary referrals? Which could be handled by a good primary-care physician?' "

The response, said Dr. Goldfinger, was overwhelming. All the specialties called upon were eager to help.

Many facets of primary care set it apart from hospital medicine.

Dr. James J. Dineen, like Dr. Stoeckle, is one of the program's teachers, and practices with the Internal Medicine Associates. He points to an emphasis on preventive medicine. Dr. Dineen, a Harvard Medical School Instructor in Medicine, said that in-hospital physicians may see a 45-year-old man who has just suffered a heart attack. In contrast, primary-care doctors are more likely to see the man when he is 35, and on his way to one.

Drs. O'Malley and Goroll arrived at the MGH by totally different routes. A Cornell Medical School graduate, Dr. O'Malley had planned on a traditional residency. But since his first year at Cornell, general medicine attracted him. He assumed he would never find the right kind of program.

But when he came to the MGH for an interview, he was surprised to hear of the new course and applied for it at once.

Dr. Goroll, on the other hand, was no stranger to the MGH. While in his first year at Harvard Medical School, Dr. Goroll took an experimental course with Dr. Stoeckle and later collaborated in running a similar course.

As graduation neared, Dr. Goroll decided to go into primary-care internal medicine. But he found no such program existed. He proposed that the MGH establish one.

His proposal came at an opportune moment. Dr. Charles A. Sanders, who had just arrived to take the General Director's post, felt the hospital should move in this direction. With his support, and with the aid of Drs. Leaf, Goldfinger, and Stoeckle, the program came to life.

The two current interns will complete the course in June 1975. After that, their futures are undecided.

"We hope there will be a number of alternatives," commented Dr. Leaf, who in addition to his MGH post is Jackson Professor of Clinical Medicine at Harvard. "They may want to get involved in the Harvard School of Public Health with learning about the management problems of a group practice, or they may want to work with the Kennedy School of Government and learn more about the government's role in supporting ambulatory care in this country. They might also take a year of pediatric training as family-practice physicians."

All the senior staff doctors involved with the primary-care plan see the two present interns as innovators and teachers of the future.

Dr. O'Malley wants to teach. But he favors group practice: "My choice is definitely practice in a group situation. I would also like to take the type of teaching situation which has developed here in the hospital and extend it to a community setting."

"I'd like to teach primary care in the medical school setting," Dr. Goroll said. "I'd like to develop a primary unit within that setting, where students and house officers could come and learn primary care; and where research into ways of delivering it could go on."

Dr. Goroll believes there will be a two-unit system for primary-care training – the community setting and the medical school.

The future of the present program? "It's too early to say," Dr. Leaf declared, "but if it is as successful as we hope, we will certainly be expanding." The project, he added, needs more funds to grow.

Like the other doctors involved, Dr. Leaf emphasized that the course is experimental. Dr. Stoeckle cautioned that although the program has been a success up to now, it is not yet a year old.

Even if it succeeds, Dr. Dineen pointed out, it will not solve all the problems of health-care delivery. It can help with one – a shortage of trained general physicians. But, for example, he said, it would not clear up difficulty in getting care to certain areas of the country.

(Concluded on Page 4)

New Primary Unit Aids Manpower Need

(Concluded from Page 3)

Some, although they agree such programs should exist, wonder whether the MGH should run one. They believe that the MGH has always been and should continue to be a teaching institution for in-hospital medicine.

Dr. Goldfinger gives two reasons he believes the MGH should train doctors for primary care: "One is that I think the MGH is what it is because it has been responsive to the health needs of its community and country. It seems to me that right now these needs are for excellent primary care."

Secondly, he asserted, the MGH has large numbers of patients with a variety of illnesses. Experience with this wide variety in an ambulatory setting strengthens the interns' training, he said.

Limits and doubts aside, however, no one would argue with the program's aims. Dr. Leaf summed them up simply: "We hope this program will provide better care for the ambulatory patient in the group practice of medicine."

PROGRAM DEVELOPERS

Dr. Stephen E. Goldfinger, an MGH physician and Harvard Medical School Associate Professor of Medicine, developed the overall primary-care program.

Dr. John D. Stoeckle heads the ambulatory training segment of the course. He is an MGH physician and holds the same Harvard academic title as Dr. Goldfinger.

Dr. J. Dennis Mull, an MGH physician and Harvard Assistant Professor of Medicine, is the senior staff doctor in the Primary Care Unit itself.

Many other MGH physicians, from both in- and outpatient services, assist in training the primary-care interns.

Parents Turn Concern Into Action

(Continued from Page 1)

understanding, two films produced by Jerome Kagan, Harvard psychologist, were shown in the parents' first session. The films stimulated many important questions which were answered in the small discussion groups that followed.

"We found out that they wanted to know more about the techniques used in the clinic and especially what they could do at home," Mrs. Wheelden said.

The staff selected five videotapes of children undergoing therapy at the clinic to show at the next session. Each demonstrated a different language or speech problem and its treatment. "The tapes were outstanding," said Mrs. Wheelden, "a real eye-opener for us and the parents.

"The father of a hyperactive child had never noticed anything abnormal about his child's behavior until he saw him on tape. The youngster was literally all over the place, standing on the table, running about. The therapist used a conditioning technique called 'time out from positive reinforcement' – putting her head down on the desk until the child was ready to proceed with the treatment."

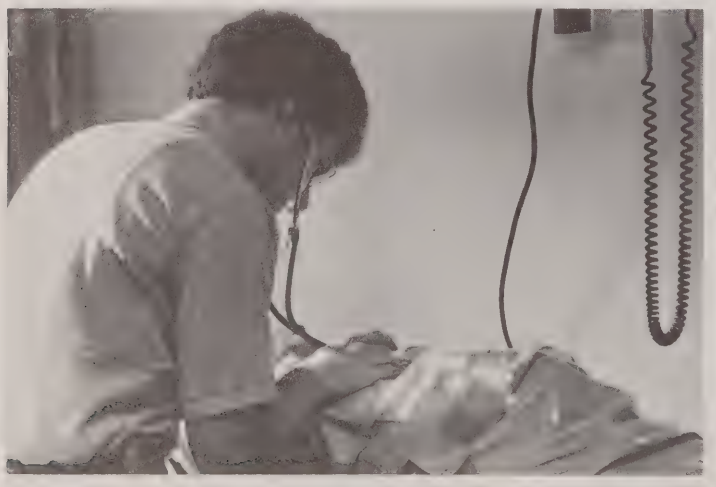
The videotapes showed concrete techniques that the parents could apply at home. "The parents' reactions to the tapes indicated that activities must actually be demonstrated," Mrs. Wheelden said. "Only then is it possible to expect them to carry out a home therapy program."

Responding to the parents' eagerness to do more on their own, the staff got to work again. By the third session they had put together for each parent a comprehensive handbook describing a variety of games, activities, and methods of communication that could be used at home. Each of these was related to a specific language skill – articulation, auditory memory, vocabulary, sentence expansion. The methods were carefully demonstrated by a therapist.

About 70 percent of the parents whose children have been seen in the Language Clinic attended at least one counseling session. The response from questionnaires filled out at the last session was so positive that the Speech Pathology Unit plans to repeat the program and to develop similar sessions for spouses and family members of adult patients.

What do the parents have in common? A deep concern for their child, a desire to help him. Beyond this, they run the gamut of social, economic, and educational backgrounds.

A profile, however, can be drawn of the child. His average age is 4½. He is much more likely to be a boy than a girl. He is frequently of average or above-average intelligence, often quite skilled with his hands. He may



Dr. Allan Goroll, one of two primary-care interns, examines a patient at the Primary Care Unit.

At the MGH Dermatology Clinic, a lesion on the scalp of patient Neil Gross, as pointed out by Dr. Thomas B. Fitzpatrick, left, the Chief of the MGH Dermatology Service, becomes part of the primary-care interns' training. The interns are Dr. Terrence O'Malley, rear center, and Dr. Allan Goroll.

not have become firmly left- or right-handed yet. He may be hyperactive. There may be a family history of mixed handedness or of reading (dyslexia) and speech difficulties.

"We're not sure how some of these traits relate to language development," Mrs. Wheelden said. "We don't like to attach labels. The important thing is to describe the speech and language behaviors of the child at the time we see him and, from our own clinical expertise and from our tests, determine whether he needs therapeutic intervention."

Language norms can be established for children as young as 18 months. The clinic staff carefully tests each child to determine if there is a significant gap between his language ability and his chronological age or general level of intelligence.

Each child is tested for hearing loss, a possible result of frequent ear infections. Examination by one of the clinic's two neurologists may also reveal a specific physical impairment such as a birth defect or neurological problem.

Results of the Language Clinic's total evaluation may reassure the mother of a stuttering child that he is going through a normal phase of language development. But in most cases, the clinic will keep in touch with the family for follow-up testing.

"We used to think that with maturation the child would outgrow the disorder," said Mrs. Wheelden. "But now we realize he might exhibit more serious problems by the time he is ready to start school. Perhaps we are preventing possible social, psychological, and/or educational difficulties by early intervention and by getting the parents to realize that they too play an important part in their child's speech and language development."

Gregory, 4, imitates the lip formations of Kay Rheinhardt, therapist, in a mirror. The other side is glass, through which his mother can observe the therapy.

Parental involvement has become increasingly important in working with preschool children. A "speech notebook" kept for each child charts his weekly progress and offers ideas for things to do at home. At least once a month parents may observe the child's 50-minute therapy session through a one-way window.

But rarely can another therapist be spared to explain what is going on. And suggestions for home activity had to be squeezed in at the end of the appointment.

The evening counseling sessions provided the turning point for many parents, giving them the confidence to translate suggestions into action. Sharing experiences in a group helped to ease a parent's sense of isolation in coping with a special problem.

A mother's expression of concern about her child's relationship with his peers brought sympathetic nods. A father could openly share his frustration:

"When my boy can't express himself at the dinner table, sometimes I just want to cry. But he doesn't give up; he gets angry – and that's good."

The questionnaires revealed that a majority of the parents had a better understanding both of their child's problem and of ways to help him. Wrote one parent, "Action can be so much more rewarding than passive concern or guilt."

Therapist Frances Senner watches a 7½-year-old place different shaped objects into a box. Naming the shapes will help him develop a specialized vocabulary.

Mrs. Margaret Ellis, standing left, plays the role of her child as therapist Kay Rheinhardt explains how the game can be used to increase vocabulary. Similar activities were demonstrated at the parents' evening counseling sessions.

Body May Cause Own Intestinal Diseases

Could the overeager defenses of the patient's own body cause two serious intestinal disorders? An MGH researcher is investigating the possibility.

The answer, his animal studies indicate, is "yes." But before this hypothesis is confirmed, he must prove that this occurs in humans – a much more difficult task.

Dr. Joseph L. Perrotto, an MGH Assistant in Medicine, is studying two inflammatory diseases of the bowel, ulcerative colitis and regional enteritis. In addition, some of his work applies to hepatitis, a liver inflammation.

Regional enteritis currently afflicts about 1 in 1,000 Americans. Ulcerative colitis affects many more.

Ulcerative colitis is an inflammation of the large intestine and usually leads to ulceration of the colon's lining. Regional enteritis usually involves the lower segment of the small intestine, the ileum, and can also affect the colon. Hence the use of the term, ileitis.

The symptoms of the two diseases are much the same: diarrhea, fever, abdominal discomfort, and weight loss.

For ulcerative colitis, medication often provides relief. When drugs fail, however, surgery to remove the colon may become necessary, and the patient must have an ileostomy. This means that food wastes are drained into an artificial appliance on the abdominal wall.

In the case of ileitis, medication also may help control the disease. But in contrast to ulcerative colitis, surgery is not always effective. Of those who have successful operations, at least 35 percent have a recurrence of the disease.

Much research has been done on these diseases and why they occur, but to date the answer is not known.

Many clues led Dr. Perrotto to believe that both diseases are the result of the body's defensive system.

This system has two parts. It is based not only on the familiar antibodies but also on the less known but equally vigilant defenders, the lymphocyte cells. Both attempt to destroy foreign objects, or antigens, which enter the system. This is known as an immunologic reaction.

Lymphocytes belong to a larger class of cells, leukocytes, better known as white blood cells. Lymphocytes are of two types: one is the T type, produced in, or under the influence of, the thymus gland, a chest organ. The other variety is the B type, which may be derived from other cells (precursor) in the bone marrow.

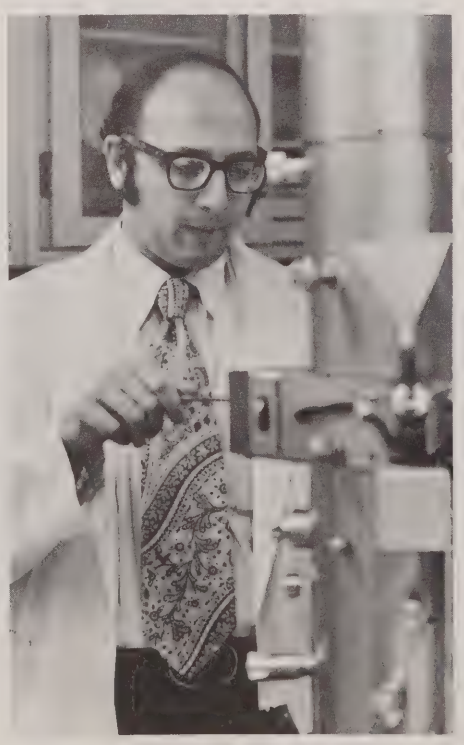
These cells produce either an antibody or lymphocyte response to destroy foreign materials. It is these cells, the lymphocytes, that Dr. Perrotto suspects cause the diseases. It appears that the lymphocytes, in their zeal to defend the body, sometimes do more harm than good. One such instance is the disease schistosomiasis.

Dr. Perrotto has helped in the study of this illness with Cleveland researcher Dr. Kenneth Warren.

Schistosomiasis begins when the schistosoma worm enters the body through the skin. This disease is common in Asia, Africa, and the Caribbean. The worm is usually carried by snails. People often come in contact with them while they bathe.

The worm itself causes no harm. It lays its eggs and settles down. The body's immune response destroys the eggs. This leaves widespread scar tissue. Several body functions are then disrupted. During this reaction, granulomas are formed.

"Granulomas are whorls of cells of a specific type," explained Dr. Perrotto. "They are seen in many disorders. The prototype is tuberculosis."



Dr. Joseph L. Perrotto at an electron microscope

Perhaps by coincidence, these formations also appear in ileitis. That sparked Dr. Perrotto's curiosity.

There were other clues. Dr. Perrotto suspected that the foreign objects which triggered colitis and ileitis were intestinal antigens derived from foodstuffs, viruses, parasites, and bacteria. He believed they might penetrate cells (epithelial) in the intestine's outer layer.

Other researchers had placed lymphocytes over a layer of epithelial cells. The lymphocytes destroyed the other tissue. This suggests that antigens broke through to the intestine, and the confused lymphocytes somehow attacked epithelial cells instead.

Previous studies also showed two other things: enzymes (chemical substances) could get through to the intestines of experimental animals. And the intestine can produce immunologic responses independent of the rest of the body.

With that background Dr. Perrotto, under the direction of Dr. Kurt J. Isselbacher, began his studies in the Gastrointestinal Research Laboratories of the MGH. In July 1972, he received a grant for this research from the National Foundation for Ileitis and Colitis. He also began to investigate acute, chronic, and convalescent hepatitis and examined lymphocytes from the blood of patients with the latter three disorders.

In the first stage, Dr. Perrotto attempted to answer the question: Can bits of unprocessed food, which might cause an immunologic reaction, get past the stomach's digestive juices into the intestine?

For his answer, Dr. Perrotto fed to rats and mice large amounts of a protein, bovine serum albumin. This protein is normally found in cows' milk. Dr. Perrotto learned that the digestive enzymes of the stomach juice broke down most of the substance into amino acids, basic building blocks of nature. But the remainder was permitted to pass into the intestine and colon and in fact to enter the body fluids. The protein accomplished this entry by first slipping into tiny sacs within the epithelial cells. It then penetrated the spaces between the cells.

Dr. Perrotto's conclusion: It is possible for dietary proteins to be absorbed from the intestine. Dr. W. Allan Walker, also of the Gastrointestinal Unit, had earlier made similar observations.

This led Dr. Perrotto to step two

and another question: Does the invasion of the proteins cause an immunologic response in the intestine or in the body as a whole?

To find out, Dr. Perrotto removed lymphocytes and antibody-containing serum from the intestine and blood of his rodent subjects. He tested each sample. In every trial, there was an immunologic response.

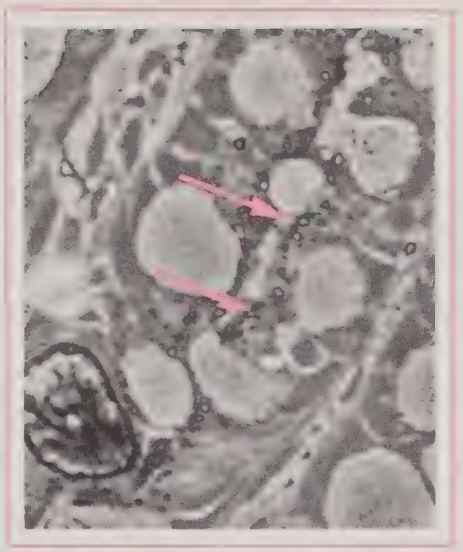
Then step three: Since he now knew that proteins could traverse the intestinal wall of rodents and trigger an immunologic reaction, Dr. Perrotto wanted to determine the type. Was it of the cellular, lymphocyte variety?

He removed intestinal lymphocytes from animals which had been fed schistosoma egg antigen and found this resulted in a cellular immune response throughout the body.

This third step is as far as Dr. Perrotto has progressed.

He describes his hopes for a fourth and final stage: "We would like to apply the same phenomena to humans for several reasons. If we can characterize the lymphocytes in inflammatory bowel disease, it may indicate whether in fact it is an immunologic response. If we know it is, and we know the type of lymphocyte, then we would be on safer ground to treat people with some of the newer drugs which can knock off a specific type of lymphocyte.

"We are able to get these lymphocytes out of the animal system. The human system is a little tougher, because of the larger mass of tissue."



In this section of a rat's colon, the arrows indicate dots of staining material. This material has adhered to tiny particles of protein which the animal's intestine has absorbed. This lends weight to the theory that foreign objects may enter the human intestine to cause two inflammatory diseases of the bowel.

If Dr. Perrotto can prove that the intestine reacts to dietary proteins and that this brings on the two diseases, what next? For ulcerative colitis, it might mean more efficient medication. That could eliminate the need for surgery. For ileitis, it might bring improved treatment.

Cancer: Steady Progress to Lower Toll

(Concluded from Page 8)

Howard Ulfelder received his early education from a series of foreign and American schools. He attended Phillips Exeter Academy and Harvard University. In 1932, he graduated from Harvard with a degree in biochemistry. That summer he married Ethel Huse, then secretary to the head of Harvard's biochemistry department.

In the fall he entered Harvard Medical School. Dr. Ulfelder does not remember agonizing over the choice of a career in medicine. It just seemed to evolve. Later, when it came time to choose a specialty, he decided on surgery with the same ease.

"I never had any doubts about having made the right decision," he remarked. "I'm transfixed with amazement to talk to medical students, interns, and even residents who are still unsure of having made the right choice. I don't know what they mean by 'right.' "

Dr. Ulfelder took his postgraduate training and then became a gynecologist at the MGH. But soon afterward war broke out, and in May 1942 the MGH unit, the 6th General Hospital, was called to active duty.

The war ended with Dr. Ulfelder a Lieutenant Colonel and chief of a 1,200-bed surgical service of a general hospital in Europe. He returned to the MGH and peacetime surgery in 1945.

In 1948, Dr. Joe V. Meigs, then the renowned head of gynecology at the MGH, asked Dr. Ulfelder to rejoin his staff. The young surgeon accepted.

When Dr. Meigs retired in 1955, Dr. Ulfelder was named to replace him. In 1962 Harvard Medical School created a professorship and named Dr. Ulfelder to fill it. Today he still holds the title of Joe V. Meigs Professor of Gynecology.

In the intervening years, he has earned fame and respect throughout the world of medicine. A member of more than 40 professional societies, he has authored numerous scientific papers, the majority dealing with gynecological cancer.

In April 1971, he and his associates reported a discovery which attracted international attention. It began when he saw a young woman with a rare form of cancer known as vaginal adenocarcinoma. He thought little of it, but when a second, almost identical case appeared soon afterward, Dr. Ulfelder was alarmed. Over the months which followed, five additional cases were treated at the MGH.

He suspected a common cause. After an investigation into the girls' backgrounds, Dr. Ulfelder found a possible culprit. It was a drug several of their mothers had taken during pregnancy to prevent miscarriages: diethylstilbestrol, or DES.

The suspicion was scientifically confirmed through a careful study by Drs. Ulfelder, Arthur L. Herbst, and David C. Poskanzer.

Since then more than 120 confirmed cases of hormone-related adenocarcinoma of the vagina or cervix have been reported around the world. The physicians point out that this represents a small percentage of the estimated hundreds of thousands of women who once took DES during difficult pregnancies.

The federal government has banned the use of DES by pregnant women and by farmers for the fattening of livestock.

Identifying environmental causes for diseases like this type of adenocarcinoma is one way Dr. Ulfelder believes physicians can lower cancer's toll. Another is developing methods of early detection. "Without question, the future will show a steady increase in the cure rate of most cancers," Dr. Ulfelder said.

He lashed out, however, at what he called "the mission-oriented, man-on-the-moon philosophy" which misleads people into the belief that all the many kinds of cancer can be eradicated.

"We can," he said, "make great strides toward diminishing cancer's toll of illness and death. And obviously that in itself is a most desirable goal."

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New Cancer Chief Will Guide a Team

Dr. Charles A. Sanders, General Director, has just created the position of Deputy to the General Director for Cancer Affairs. The following article is about the man who will fill that post, and about his ideas on cancer care. [Editor's Note.]

Dr. Howard Ulfelder's philosophy of cancer treatment relegates his own early training to somewhat the status of a relic.

"I was graduated into active medical practice," said the MGH Chief of Gynecology and the Vincent Memorial Hospital Chief of Staff, "in an era dominated by great individual figures. And although there are still outstanding individuals, whose names are known to all of us and who dominate their specialty or local environment, they are no longer the only points of reference. This I consider to be evidence of progress with the times."

Dr. Ulfelder believes that, in the future, teams of physicians will predominate.

This belief will guide the internationally known gynecologist as he leaves a 25-year-long career to assume his new MGH post.

He will coordinate all cancer treatment and many research projects at the MGH. Most of his tasks will focus on the activities in the new Cox Cancer Center, due to open late this year. From his base of operations in the center, Dr. Ulfelder will work with the new building's future occupants: medical oncologists (tumor specialists) – chiefly in the fields of immunology and chemotherapy (drug) – radiation therapists, surgeons, and representatives of all the clinical services of the MGH. He will thus coordinate the treatment of cancer and many research projects, which will remain in their present locations throughout the MGH.

In his Vincent Memorial office, Dr. Ulfelder discussed cancer. Behind his desk, his ruddy complexion was barely visible in the circle of yellow light from a lamp which hung in front of him. In the darkened corners of the room, papers and publications lay neatly stacked on shelves and tables. There was an air of calm and order.

"No longer," said Dr. Ulfelder, "can one physician know enough about all the aspects of cancer management to treat a patient by himself – even when what might be considered ordinary everyday tumors are involved. I hope to encourage the closest kind of intercommunication among people dealing with cancer in this hospital. In this way we should be able to offer every patient the benefit of as much special knowledge and skill as is available.

"Despite the coordinated efforts of such teams, some patients cannot be restored to health. For them and their families, emotional support is necessary. The type of expertise that our psychiatrists and social workers have developed has become an important aspect of team care and will be increasingly emphasized in the future."

Dr. Ulfelder spoke slowly, his baritone voice retaining its characteristic deliberate calm. Only occasionally did it rise and tense – to emphasize a point.

"All the specialties have an important role to play in the proper treatment of the cancer patient," the new Cancer Affairs chief said, "and since all specialties will be represented in the new Cox center, a patient could benefit from several types of consultation or treatment with one visit, and leave on the same day."

Dr. Ulfelder, who will gradually assume the tasks of his new office, was born in Mexico City in 1911. His father, a New York surgeon, and mother, a nurse from Illinois, had come separately to Mexico on visits. What they found persuaded them to settle. Later they met and married.

(Concluded on Page 7)

Dr. Howard Ulfelder in front of the MGH Cox Cancer Center, now under construction.

MGH News

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Treating a Common Pain, As Old As Mankind

Joseph C. Aub: A Giant Among Investigators

When a great discovery is made, it arouses wonder. But in a generation it becomes a part of day-to-day life, an ingredient of habit.

In a way, this is true of the work of Dr. Joseph Charles Aub. At the MGH, he researched the human metabolism – the basic chemical processes of the body. His discoveries were so broad and contributed so much to medical knowledge that it is difficult to believe they were ever unknown, let alone that they were uncovered by one man.

This giant of an investigator died on December 30, 1973, at age 83, after a long illness. What follows is his story. [Editor's Note.]

To look at Dr. Aub, you could almost guess what kind of man he was. His head was large for his body. It appeared to bulge with the intellect that filled it.

But intellect was only half the picture. More prominent than his bushy eyebrows and wide jaw was his characteristically warm smile. It betrayed the temperament of the man behind it.

"He was a delightful combination," said a friend and colleague, "a brilliant, imaginative scientific investigator and an extraordinarily warm, sensitive human being."

Joseph Aub, this delightful mixture, was born in Cincinnati, Ohio, in 1890. His parents were Samuel and Clara Shohl Aub, both second generation German immigrants.

The younger Aub was named after a popular uncle, a well-known ophthalmologist. Although he died before Joseph was born, his uncle served as a model. This made medicine Aub's most obvious choice as a career.

At age 17, Joseph Aub went to Harvard College. He had looked forward to playing football, but his weight, 88 pounds, relegated him to coxswain on the freshman crew.

At Harvard a teacher, the renowned biologist George Howard Parker, influenced Aub the most. Under his tutelage, Aub studied the flounder and

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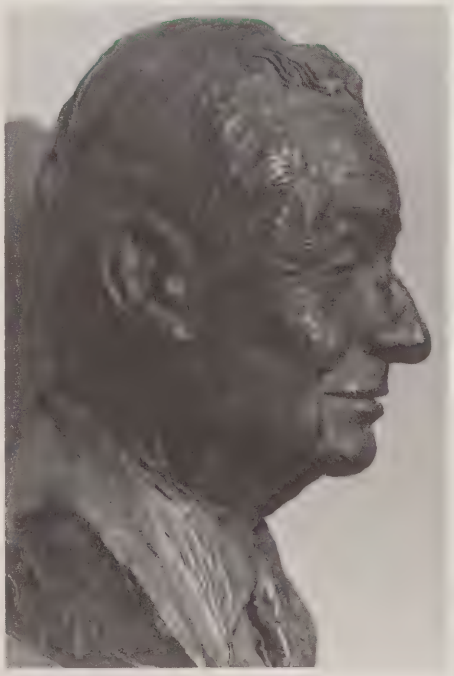

Bust of Dr. Joseph C. Aub
(The work of Dr. Norman R. Bernstein, an MGH psychiatrist)

A new clinic to treat one of the commonest and oldest orthopedic problems has opened at the MGH.

The unit, sponsored by the MGH Department of Orthopedics, is one of the handful in the nation devoted solely to the diagnosis and treatment of lower-back pain.

Nearly everyone suffers from this at some time in his life. Not all of us, however, need medical attention for the phenomenon.

The two orthopedic surgeons who direct the clinic started it at the urging of Dr. Henry J. Mankin, Chief of the Department of Orthopedics, after seeing large numbers of back-pain patients in their combined private practice. The surgeons, Drs. James I. Huddleston and Robert J. Boyd, believe the special clinic can bring new treatment methods to such patients.

Drs. Boyd and Huddleston intend that the unit, which opened in November, will provide the more individualized, more consistent, long-term care they feel back-pain sufferers require. Dr. Mankin supports that idea.

Following a multidisciplinary approach, the new facility relies on the services of MGH neurologists, neurosurgeons, social workers, physiotherapists, and Dr. William H. Anderson of the MGH Department of Psychiatry. All play significant roles in the diagnosis and treatment of lower-back pain.

The clinic's first full year of operation will mark the anniversary of a major breakthrough in back-pain treatment. Two MGH doctors made the contribution 40 years ago. In August 1934, Dr. Joseph S. Barr, Sr., an orthopedic surgeon, and Dr. Jason

(Continued on Page 2)

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EDITORIALS:

Relief for an Aching Back

In 1934 two MGH surgeons reported a type of operation that proved a boon to sufferers of ruptured lumbar discs, the leading cause of severe lower-back pain. Forty years later that same surgery remains the primary means of correcting this excruciating condition.

Now in the anniversary year of the reporting of the operative procedure, the MGH is announcing a new clinic – one for the relief of lower-back pain. The unit is one of a handful in the country devoted exclusively to this purpose. As a page 1 article in this issue points out, back pain is as old as the decision by man's ancestors to stand erect. The new clinic should make important contributions to alleviating a problem that is so widespread.

To treat patients suffering from this condition, one procedure will remain the surgery devised at the MGH. In addition an alternative technique which the MGH was among the first few hospitals to use is also available for treatment of ruptured lumbar discs. Rather than surgical removal, chemonucleolysis, as it is called, employs the injection of an enzyme. The new method must be performed under anesthesia in an operating room. It should not be used for all patients with the ruptured-disc problem. Like any operative procedure it is not without risk. And it is too new to predict with certainty its long-term value. But this new treatment shows early promise.

Two Former Greats

In the space of one month the MGH has lost two of its former greats. Dr. Joseph C. Aub was a giant whose intellect led him to brilliant findings in many areas of medical endeavor. His story appears on page 1 of this issue. Dr. Louis L. Dienes' fame rests largely with his discovery in man of Mycoplasma, a strange disease-causing organism that is neither virus nor bacteria. His story appeared in the February 1970, *MGH News*. While both physicians were retired, their deaths serve to remind those who knew these two gentle men that science and humanity do mix very well indeed.

Conservative Care Relieves Most Back Pain

(Continued from Page 1)

Mixter, a neurosurgeon, published a report on a successful series of operations to relieve the major cause of lower-back pain – lumbar disc ruptures. The operation involves the removal of part of a disc.

Forty years later this procedure remains the most common form of surgical treatment.

The discs are pads of cartilage which connect the bones of the spine (vertebrae). In some ways, a disc resembles the accordion-like canopy which often joins the cars of trains. When a train rounds a bend, the covering compresses on the inside of the turn and stretches on the outside. Similarly, when a person bends or twists his back, the cartilage can compress in one area and stretch in another.

The five bottom vertebrae in a human skeleton are known as the "lumbar" vertebrae. Thus the discs which connect them are the lumbar discs.

Through years of use, these bear the full weight of the body. Consequently they feel the strain.

This problem probably had its roots in centuries past. Man is believed to be a descendant of creatures which stood and moved on all fours. These vertebrates probably had a backbone well suited to a four-footed existence. Such a spinal column could bear very little weight, but enough.

When this early ancestor began to walk upright, however, the spine failed to evolve. A backbone designed to carry a minimum of weight was forced to support the entire torso.

In each of us, after several years of bearing our own weight, the discs begin to degenerate. They can flatten or break.

A disc is made up of two types of cartilage. Its center contains a soft, almost liquid material. Its outside, a receptacle for the soft center, is hard and rubbery. A disc rupture is a break in the hard outer shell. This allows the center to ooze out.

Ruptures do not always cause pain, usually only when the escaping center presses on a nerve. When this happens, treatment becomes necessary.

Disc ruptures, though common, are

A resident in orthopedic surgery, Dr. John B. Emans, II, is flanked by the directors of the lower-back pain clinic, Drs. Robert J. Boyd (left) and James I. Huddleston, during a discussion of a patient's X ray.

not the only cause of back pain. A muscle weakness, correctable by the appropriate exercise, is one frequent source. Arthritis is another. Osteoarthritis, for instance, which often comes late in life, causes flattened discs and a stiff back. While not as common, spine tumors and many other rarer disorders can produce pain.

Commonly disc ruptures also result in leg pain. This happens because the sciatic nerves, which transmit sensation from the legs, go through the spine. They enter it through the sides of the lumbar vertebrae. With these nerves so close, ruptures often press on them.

There are several ways to relieve this discomfort. Rest is tried first and usually succeeds. Doctors instruct the patient to avoid exertion and to relax. He may have to stay in bed at home for a long period.

Coupled with rest, other types of therapy can help. Medication can temporarily remove pain until the patient recovers. Heat treatment helps relax muscles which have tightened because of pain. Physiotherapy may help prevent a recurrence by strengthening the muscles of the back and abdomen.

"We always try these measures before we go on to anything else," Dr. Huddleston commented, "because we know that most back-pain problems will respond to conservative treatment. If we get an inadequate response to these things, we can then proceed to other alternatives."

One of the more radical treatments is the surgery reported by Drs. Barr and Mixter. The other is a recently developed noncutting surgical procedure known as "chemonucleolysis."

Chemonucleolysis is the injection, into the disc, of the enzyme chymopapain. This is the same enzyme found in meat tenderizer. Derived from the leaves of the papaya plant, this substance shrinks the disc, thus relieving pressure on the affected nerve.

Performed in the hospital under general anesthesia, this procedure often greatly shortens hospital stay and recovery, and therefore can save the patient considerable expense. The treatment is one of those which helped inspire the establishment of the back-pain clinic.

"The rationale behind chemonucleolysis," Dr. Huddleston asserted, "is that if we can shrink the disc and relieve pressure on the nerve root, then we've accomplished what conventional surgery would, without making an incision. We've done it without as much risk as is inherent in the classic operation.

"In fact, in a series of 250 patients treated this way over the past two and a half years, we have experienced no complications.

"The enzyme, however, will never completely replace surgical removal. There are some disc ruptures that are too bad to be treated with the enzyme. In addition to pain, the disc rupture can involve the nerves to produce weakness or interfere with bladder and bowel function. In instances like that, we proceed directly to surgical excision. We also find that method effective when the enzyme doesn't work adequately."

To perform a conventional disc-rupture operation, a surgeon simply removes all of the disc's soft center. Patients can still function effectively with the disc's tough outer ring intact.

Neither surgical excision, nor the enzyme, nor rest guarantees complete end to back pain.

"Back problems," Dr. Huddleston said, "are not cured instantly. It's a lifelong sort of treatment. Once the disc has been ruptured or injured, it is abnormal for life, whether it causes pain or not. If we can get someone past the acute episode either with rest, the enzyme, or surgical removal, then it's still necessary to instruct him on how to take care of his back for the rest of his life."

Can these problems be averted? Dr. Huddleston pointed out that there is no way to halt wear and tear on discs. Everyone can, however, avert a rupture if he avoids straining his back. To accomplish this, he should stand close to an object and crook his knees to bend or to lift it. In this way he lifts with his legs instead of the back.

In general, to help prevent back disorders, people should stay in good physical condition, with special attention to their back and abdominal muscles.

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One Great Find Lit Up His Later Years

(Continued from Page 1)

discovered, by dissection, how the fish managed to move an eye from one side of its head to another without distorting its vision.

In 1911, he finished college a year early and went to Harvard Medical School. At once, he was influenced by a man he would come to admire greatly, Dr. Walter B. Cannon.

Dr. Cannon was a scientist's scientist. He understood the rigid requirements of research. Of its pitfalls, the pleasure it could give, and the perseverance it demanded, he knew all. And from Dr. Cannon, Aub learned much.

Dr. Cannon invited him and two other students to use his laboratory to study the influence of cigarette smoking on adrenaline flow. Their results, published in 1912, showed that nicotine stimulated it.

At the age of 22, Aub's career as an investigator had begun.

He earned his M.D. and went on to an internship at the MGH. As a beginner, or sub-sub pup (pupil), the youthful Dr. Aub charmed the nurses he worked with. For Christmas in 1914 they gave him a carved wooden puppy. This later became a mascot for all interns, but the shift to a pup-less internship during World War II ended the animal's era.

After his internship, Dr. Aub journeyed to the Russell Sage Physiological Laboratories in New York. With Drs. Eugene Dubois and Graham Lusk, the promising researcher from the MGH investigated various aspects of the metabolism of the endocrine glands. These are organs which serve a dual purpose. They remove certain materials from the blood. The glands then convert them to substances which either leave the body or remain to aid its function. This became one of Dr. Aub's major interests.

At this time, Dr. Aub began to acquire a habit which endured for the rest of his practice of medicine. When he saw a new patient, he often made a new friend. Many of his early patient-acquaintances were circus people, such as giants and pituitary dwarfs, whose metabolisms had malfunctioned.

In 1916, Dr. Aub returned to the MGH to become a resident in medicine. He and a colleague, Dr. Paul Dudley White, who became a lifelong friend, studied the effect on the heart of hyperthyroidism, a glandular disease.

The war in Europe, which the United States entered in 1917, called Dr. Aub to duty with the MGH unit, the 6th General Hospital. He spent almost two years with the military. In France, under the direction of Dr. Cannon, he searched for a clue to the cause of traumatic shock in patients just wounded.

At war's end, it was back to the MGH and Harvard Medical School for an Assistant Professorship. Under Dr. Cannon once again, he continued to study shock and discovered that patients in shock have a diminished supply of oxygen in their blood.

The early twenties brought one of Dr. Aub's most important contributions: his lead-poisoning breakthrough. At that time lead poisoning was far more common than it is today. In industrial plants throughout the country, workers in droves were afflicted by it.

Dr. Aub took up this work at the urging of Dr. David Edsall. Dr. Edsall, onetime Dean of Harvard Medical School and former Chief of the MGH Medical Services, was to imagination and foresight what Dr. Cannon was to rigor in scientific investigation. In a way, Dr. Aub combined some of the best features of these two men, but with added qualities.

In his lead-poisoning research, Dr. Aub found that if a patient with that condition received large amounts of calcium, it pulled lead, already in the body fluids, into the skeleton. This ended abruptly the excruciatingly painful muscle spasms of the colic of lead poisoning.

If the same patient, now comfortable, were changed to a low-calcium diet, Dr. Aub observed, the lead began to leave the bones with the calcium, and the colic returned.

Dr. Aub then heard of discoveries that a hormone produced by the parathyroid gland, an endocrine organ, could draw calcium out of the body. He obtained a sample of the hormone. When it was administered to patients, he found it had the same effect on the lead deposited in the bones.

Alone, these results had great impact on patient care. They were revelations. But they also led to other important findings. Not the least of these was the understanding of how the parathyroid hormone affected bone calcium. In turn, this led to the discovery of the disease hyperparathyroidism. That was a finding in which Dr. Aub would later participate.

His lead-poisoning studies started on animals in 1922 in the Department of Physiology at Harvard Medical School and were completed on patients at the MGH Department of Medicine.

As Chief of the MGH Medical Services, Dr. J. Howard Means in 1924 put him in charge of the newly created Ward 4 where the first study was that of the lead-poisoning patients. Ward 4 became a famous center for patients with diseases of the metabolism and is the subject of a book.

It was also in 1924 that Dr. Aub met a first-year medical student named Oliver Cope. Cope had approached Dr. Aub to get his advice on a research idea.

Now on the MGH Senior Consulting Staff for Surgery, Dr. Cope described the meeting:

"I had lunch with him to consult him about what I had in mind. He gave me just the encouragement a student needed. He had a broad, warm smile and the most engaging interest in you. All of us who came to see him soon

Two MGH greats early in their scientific journeys: Dr. Aub (left) and Dr. Paul Dudley White (right) explore the Pyrenees during a 1921 European trip.

In early television program, Dr. Aub (left), as Huntington director, looks on while two of his co-workers demonstrate, with the help of children's blocks, how a radioactive tracer could aid cancer researchers. Standing are Drs. Nancy L. R. Bucher and Paul C. Zamecnik, who later succeeded Dr. Aub at the Huntington.

noticed that we, not he, were doing all the talking."

Six months later, Cope went to work in Dr. Aub's laboratory. He invited Dr. Aub to visit the Rhode Island summer home of the Philadelphia Copes to meet his mother and sister, Elizabeth.

"That was all I had to do," Dr. Cope remarked. In June of 1925, Dr. Aub married Elizabeth Cope. It was a union which brought three daughters and great joy. With his family, Dr. Aub shared his love of literature and music. A devoted father, he often accompanied the family to the ocean shore for swimming, but he preferred to sit on the beach and talk, seldom venturing further than knee-deep in the surf.

The following year, 1926, brought an important patient to Dr. Aub and Ward 4. It was Captain Charles E. Martell (November 1972, *MGH News*) with an unknown bone disease. As a result of Dr. Aub's studies, Captain Martell's basic ailment, hyperparathyroidism, was discovered.

At that time the origin of this disorder was unknown. It was Dr. Aub who noted that Captain Martell's shrinking skeleton behaved as if he had been injected with large doses of the parathyroid hormone. This was based on the lead-poisoning observations.

Dr. Aub's career then took its biggest turn. In 1928, the Harvard Cancer Commission, acting on Dr. Edsall's prophetic belief that the clues to cancer lay in studies of the basic metabolism, invited Dr. Aub to head the Huntington Memorial Hospital for Cancer Research. The Huntington, then independent, is now part of the MGH.

This appointment attracted fire from many doctors because the link between cancer and metabolism was a new idea. For different reasons Dr. Aub was reluctant to take the post, but he accepted it anyway.

Dr. Paul C. Zamecnik, Dr. Aub's successor as director of the Huntington, recalls that Dr. Aub's reluctance related to the climate of the times: "It was with misgiving that an accomplished, bright young man could be enticed to work in cancer research. This was regarded as a place in which promising people and their reputations were buried. It was too early to make striking advances in the field. It was hard going and took patience, doggedness, and perseverance."

Luckily these were among Dr. Aub's possessions.

But progress was slow. Dr. Aub and his associates studied cancer as a failure of growth control. And although this led to some interesting discoveries, most results were only groundwork for the future.

Dr. Zamecnik, who became Dr. Aub's good friend, joined the Huntington in 1936. Later Dr. Zamecnik spoke of that time as "a period of lean years, good largely for gathering gray hairs and crow's-feet about the eyes."

The war and the Huntington's move to the MGH, both in 1941, brought changes. Using techniques developed since World War I, Dr. Aub and coresearchers found that immunization could help prevent shock.

During the war Dr. Aub suggested research which led to useful findings on the storage of blood. Using blood with radioactive iron-tagged red cells, the study revealed that immediate refrigeration was the best approach to preserve the cells. At that time the Armed Forces flew blood to theaters of war and refrigerated it on arrival. The Navy changed methods at once, the Army a little later.

Dr. Aub continued as Huntington director until 1956. "In these years," commented Dr. Zamecnik, "I think he was more interested in serving as a catalyst for medical research than as a bench-top lab worker."

Dr. Aub continued to encourage young doctors. He fed them with research ideas and stimulated them with pointed questions.

"He influenced class after class of students, interns, and residents," Dr. Cope said, "into a more imaginative and tutored life in medicine. He had that extraordinary ability to catch a young person's interest."

After retirement in 1956, Dr. Aub made one last discovery – perhaps as important, in Dr. Zamecnik's eyes, as any Dr. Aub made in his life.

At the invitation of Dr. Benjamin Castleman, department chief, Dr. Aub had gone to work in a laboratory in the MGH Department of Pathology.

There he made biochemical studies of the surface of the cancer cell. He compared it to normal cells. The cancer cell's surface, he found, made it more prone than normal cells to stick to certain substances. This discovery, which entailed difficult, detailed work, has become an important basis for cancer research.

As years progressed, Dr. Aub's health began to fail. He was forced to stop seeing patients. In 1964, a series of strokes put an end to his research. From then on he led a quiet life.

Above all in these last years, Dr. Aub enjoyed the company of others. Dr. Alfred Kranes, Dr. Aub's personal physician and friend at the MGH, was a Belmont neighbor of his. Dr. Kranes recalls seeing another neighbor and friend, Dr. Paul D. White, walking with Dr. Aub at all times of the year. An eager Dr. White would urge on a not-so-enthusiastic Dr. Aub, who loved the conversation but did not share Dr. White's passion for exercise.

Six months before his death, Dr. Aub's worsening condition forced him to enter a nursing home. A charmer to the last, the physician won the instant affection of the nurses who cared for him, just as he had of the nurses he worked with as an intern 60 years before.

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Routine of Diabetes – Like Brushing Teeth

(Concluded from Page 7)

been designed as well. There are, for example, Italian, Chinese, and soul food diets.

Beyond diets and insulin, there is a third treatment for diabetes: oral medication in the form of tablets.

Every tablet of this type belongs to one of two classes. One group, the sulfonylureas, can aid only diabetics who have some insulin reserve in their body. The other, biguanides, can help even patients who have no insulin at all.

These drugs, however, are at the center of a controversy. And the MGH Diabetes Unit has chosen to use neither type.

The controversy involves a study begun about 1960 by the MGH and 11 other centers and continues today. Known as the University Group Diabetes Program, it was set up to test the effectiveness of various treatments on the vascular complications of diabetes. Included for study were tolbutamide, a commonly used sulfonylurea, and phenformin, the only biguanide marketed in this country. Also investigated were two insulin-treatment groups, one in which the insulin dose was fixed, and one in which the doctor varied it in an effort to normalize the blood sugar. A third group was treated by a placebo (sugar-coated substitute). All groups received appropriate diet.

After about seven years it was noticed that in the group of patients taking tablets, there were more cardiovascular difficulties than those on diet or insulin.

"The reason or reasons for these observations have never been explained," Dr. Martin reported. "No one has ever proved that tablets did cause cardiovascular difficulties, but because the investigators thought the findings were significant, the drugs were stopped in the study.

"This threw the whole area of diabetes treatment into a turmoil. The tablets had enjoyed widespread popularity because they were a simple – perhaps overly simple – way of handling things."

Diane Smith, RN, a Diabetes Clinic nurse, instructs a patient on how to administer an insulin injection. After more than half a century of use, insulin remains the backbone of care for many diabetics.

Many authorities challenged the validity of the University Group Program, and some continue to prescribe tablets for their patients.

Diabetes has its share of mysteries. At the MGH and other research centers across the country, investigators are struggling to try to unravel these secrets.

No one knows, for example, exactly how insulin works. And no one is sure of the precise mechanism by which diabetes can lead to eye, kidney, and nervous complications.

The MGH Diabetes Unit, in addition to its clinic and research efforts, treats a number of inpatients per week in a consultative role. Usually they have the more complicated or unusual forms of the illness.

The MGH unit also consults with other MGH services on diabetics requiring some form of medical treatment unrelated to their diabetes. Surgery, for instance, can pose more risk for such a patient than for nondiabetics.

Although the MGH, like all major medical centers, treats a higher proportion of the more unusual cases, outpatients still make up the bulk of the diabetics the hospital cares for.

Outpatient diabetics learn to handle much of their treatment themselves. When they first come to the clinic to see a doctor, they receive an instruction booklet on their disease and information on how to perform their own urine sugar tests (reflecting blood sugar). If necessary, the proper method of injecting themselves with insulin is taught by the nurse in the clinic.

A diabetic customarily sees his doctor three or four times a year. He contacts a doctor at once if his regular urine tests indicate a change in his condition.

"I think the precautions required of diabetics can be made habitual, like brushing your teeth," said Dr. Martin. "Then the diabetic life can usually be made to be comfortable and in many cases essentially normal."

MGH News

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A Toxic Metal + Industrial Violations = Disease

Opening a Window on Very Early Cancers

(First of a Series on Radiology)

Xeroradiography sounds like a combination of a copying machine and an X-ray device.

That description, though not completely accurate, lies very close to the truth.

The xeroradiograph, a diagnostic X-ray instrument recently installed at the MGH, shares the same basic principle as the office copier.

This basic process allows the new machine to offer many advantages over ordinary X rays.

The device, however, does have limits. It can only diagnose diseases or injuries of the arms, legs, face, neck, and breasts. Use in the thick tissue of the abdomen or brain is not possible since the machine would have to employ excessive radiation to be effective in these areas.

Within these limits, however, the new device is faster, more accurate, more comfortable for the patient, and may eventually offer cost savings over conventional methods. As an important bonus, the xeroradiograph exposes the patient to 80 percent less radiation.

Since its arrival at the MGH one and one-half years ago, it has been under the direction of Dr. Lester Kalisher, one of the few trained and experienced xeroradiographers in the country. The X-ray tool at the MGH was one of the first two installed in New England. By the end of 1973 the area xeroradiograph population had reached 26, and the MGH had examined over 1,300 patients.

Its presence, combined with the expertise of Dr. Kalisher, his staff, and colleagues, has given the MGH the only full-time breast-cancer X-ray center in New England.

"Most of our work," Dr. Kalisher reported, "has been in the evaluation of breast disease of which breast cancer is our main concern."

He emphasized the importance of this use. In the next year, he pointed out, doctors expect more than 75,000 new cases of breast cancer in the United States. The xeroradiograph offers hope of catching some of these cases in their early stages.

"Studies have shown," Dr. Kalisher declared, "that if you can discover a cancer extremely early, before it's felt that there has been little chance of spread, the cure rate is very high."

With the arrival of xeroradiography, early diagnosis of breast cancer should

(Concluded on Page 4)

Durable and light, the circle of metal (beryllium) at right weighs slightly less than the quarter at left, which is much thinner.

Excessive concentrations of a toxic metal are probably endangering the health of a large group of American industrial workers, an MGH physician charges.

The metal is beryllium, used at 8,000 refining, manufacturing, and other work locations in the United States.

The physician is Dr. Homayoun Kazemi, Chief of the MGH Pulmonary Unit and Director of the U.S. Beryllium Case Registry, located at the MGH.

A considerable number of the 8,000 plants, Dr. Kazemi says, have not adhered to the now 25-year-old federal regulations designed to protect workers against developing beryllium disease.

If inhaled repeatedly in powdered form and in large doses, beryllium can cause a serious, often chronic disease which primarily affects the lungs. The dust from the metal can be dangerous to individuals working with beryllium in extraction and manufacture but not to people handling a finished product containing beryllium.

This metal is very useful to industry. It is light and resists heat and corrosion well. Such qualities have made its use widespread in computer, ceramics, and aerospace manufacturing. Beryllium dust is also found at plants which refine it from beryl ore.

The metal's utility continues to spread its use. Recently the rising price of gold has made practical the application of the material in dental fillings. This trend could expose workers in the industry, though not dental patients, to toxic concentrations.

Beryllium disease itself has a char-

(Continued on Page 2)

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Should Such a Child Be Saved?

When should a physician cease heroic efforts to save the life of a desperately ill infant? That is a question haunting many doctors. It grows in importance each year as medical expertise expands. An infant who would have died 10 years ago often can be saved today. Usually he will develop into a normal youngster. Sometimes he will not. In some cases no physician can predict with certainty whether as a result of a grave illness a given infant will become retarded. Often, however, a child is born with physical or mental deformities that predictably doom him – if he should survive – to a hopeless life of vegetation in a state institution. Or he might remain forever unconscious. The cost to the taxpayer of treating him in a pediatric intensive-care unit might reach tens of thousands of dollars. Add to this the scores of thousands of dollars required to preserve his meaningless state in an institution. Should such a child be saved?

A symposium conducted recently at the Shriners Burns Institute by the MGH's Joseph S. Barr Pediatric Intensive Care Unit asked that type of question. Physicians, nurses, lawyers, ethicists, clergy, and a social worker from eastern United States discussed the problems. One suggestion was that the physician should guide himself by the parents' wishes. But can the parents bear the potential guilt of such decision-making? In addition some objected that the father and mother might not desire to be "burdened" by an even mildly disfigured or handicapped child. Should such an infant be condemned to die? Another guideline was for the physician to place himself in the role of a seriously defective infant and ask whether the doctor himself would wish life under the conditions facing the infant. That idea seemed to engender much support. But who can say whether an imbecilic child is happy? Or whether a limbless human enjoys life? Some people with all their faculties and wealth are miserable. Others maimed, deformed, and penniless habitually thrill to the sharp chuck-chuck of a chipmunk or to the sight of sun shimmering through a tree. Who is to say into which category a given infant will one day fall?

In some instances the degree of deformity or intelligence may render an easier decision. A conference like the recent one cannot hope to provide more than rough guidelines. To issue firm edicts might push this country into the sort of dictatorial abyss that would diminish the quality of life we would be trying to improve.

Yet each of us must face these questions. Though the answers are torturous, we can best decide from a position of knowledge. As Dr. Charles A. Sanders, General Director of the MGH, said: "This is an issue that provides no easy answer for either physician or layman. What is involved goes far beyond medical care and into the realm of social concern. . . . We hope that the grave questions raised will be debated by the public. We welcome the guidance of concerned citizens."

Registry Uncovers Toxic Levels of Metal In Industrial Plants

(Continued from Page 1)

acteristic, common to many occupational diseases, which makes it difficult to diagnose and study. After exposure to the metal it takes months, or often years, for the condition to develop. To insure prevention a central file is vitally needed.

The Beryllium Case Registry, the first center of its kind in the nation, has many tasks. The unit receives referrals, keeps records on all reported cases, performs studies, and advises on control of the illness. But all these activities point to a single goal: prevention.

To advise businesses and unions on preventing the disorder, Dr. Kazemi and registry co-workers have toured plants throughout the country. They have monitored air beryllium content. And they have examined workers.

To Dr. Kazemi the results were disturbing. Established in 1949, federal regulations are clear: Beryllium content over an eight-hour workday may not average more than two micrograms per cubic meter (about one cubic yard) of air. At any one moment no more than 25 micrograms per cubic meter is allowed.

At some plants monitored, Dr. Kazemi stated, beryllium was present at "thousands of micrograms per cubic meter."

Some of these findings prompted action. In 1972 at the request of the management and the Oil, Chemical, and Atomic Workers Union, Dr. Kazemi's group surveyed a beryllium extraction plant in Pennsylvania. Beryllium levels at the facility exceeded federal limits in several areas. Two workers were already known to have beryllium disease. After massive screening the registry found six more cases among the 219 workers.

Following negotiations, union and management agreed on a plan to monitor levels of the metal dust and provide adequate ventilation to keep them within safe limits. They also assented to sharing the program's costs.

Beyond the results of tests at plants, the registry has further evidence of industry neglect: beryllium disease patients whose exposure to the metal came after the establishment of federal safety standards.

Since many cases are believed to go

undiagnosed, no one knows how many workers develop the ailment. But of 837 illnesses in the registry at last count, 41 were added in the years 1969 through 1972. Of these 41, 24 individuals had come in contact with beryllium since 1950.

Had industry strictly adhered to safety guidelines, Dr. Kazemi said, none of these 24 cases would have developed.

"I know of one place which has met the standards vigorously," he said, "the Los Alamos Atomic Energy Commission [A.E.C.] laboratories in New Mexico. They have not had a single case of beryllium disease in more than 20 years, and the same is true at Massachusetts Institute of Technology."

Some firms have failed to meet federal standards, Dr. Kazemi stated, "because the costs of monitoring a plant's beryllium levels are not insignificant."

The U.S. Department of Labor, he said, which since 1973 had the power to close plants and impose fines in enforcing the regulations, is hampered in its work because of limited funds and manpower.

Although largely a lung disorder producing shortness of breath, cough, and eventual respiratory insufficiency, beryllium disease can affect many organs of the body. The illness can come as an acute, single episode. More often the ailment is chronic. When lung disease is severe, it may also lead to heart failure. Although no cure exists, patients can survive many years. Medication can relieve their symptoms and make them more comfortable.

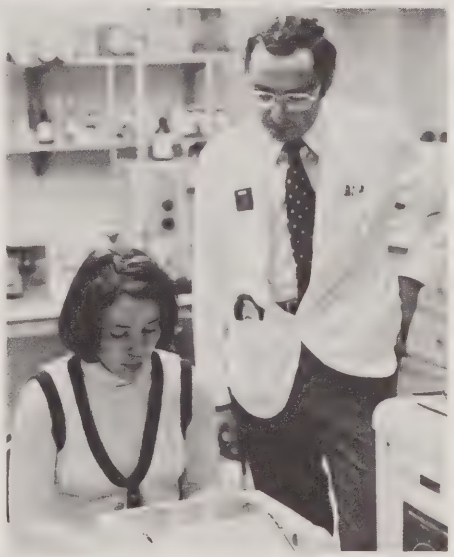
Researchers have discovered that beryllium causes cancer in some animals. Studies are now under way to determine whether it has the same effect on humans. Though somewhat controversial, preliminary results indicate man may develop cancer after long-term exposure.

Inhaling beryllium is the only way to contract the disorder. If eaten by accident, the metal does not have the same toxic effect.

No one is quite sure exactly how the disease is caused. Some believe that a certain percentage of the population is overly sensitive to the metal. Others believe that the metal is directly toxic to the body and therefore everyone is equally vulnerable.

Cases reported to the registry in recent years have revealed a new twist in the origins of the disorder: so-called "neighborhood cases." These were incidences of beryllium disease in patients who did not work in a plant using the metal but lived in the vicinity of one. They apparently contracted the illness by breathing beryllium dust in the neighborhood air, and some women did by handling the clothes of their husbands who worked in the beryllium plant.

Such occurrences, however, are rare. Although there is a total of 72 neighborhood cases in the registry, in the years 1969 through 1972 only one such patient appeared among the 41 reports.



Dr. Homayoun Kazemi, Director of the U.S. Beryllium Case Registry and Chief of the MGH Pulmonary Unit, watches as Susan Denoncourt, secretary, asks the computer for information on some of the 837 patients in the registry file.

To help detect cases (which might not be diagnosed), the registry maintains a referral service for doctors. The center invites them to send tissue samples and X rays to the MGH Pulmonary Unit for analysis.

Dr. Kazemi's group has also helped the federal government establish the proper exposure limits for beryllium.

Above all the center is just what its name denotes – a registry. It has files crammed with detailed information on the disease.

"The Beryllium Case Registry is the first and most comprehensive center for an occupational disease, its complications, where exposure took place, and so on," Dr. Kazemi explained. "In this way, we can provide expert advice on how to prevent the disease."

To handle the information it acquires, the registry has a computer storage system. This was designed specifically for the center by Dr. Howard L. Bleich of Beth Israel Hospital.

"We can just push a button," Dr. Kazemi remarked, "and the computer will tell us how many patients there are in Pennsylvania and what their symptoms are."

At the MGH the registry has available the services of a pathologist, Dr. Gerald Nash; a radiologist, Dr. Alfred L. Weber; and a chest physician interested in occupational disease, Dr. John D. Stoeckle. The unit also receives assistance from the Industrial Hygiene Section of the Department of Occupational Medicine at the Massachusetts Institute of Technology.

The center for beryllium disease is now funded by the U.S. Public Health Service. An MGH Clinical Research Fellow, Dr. Faysal M. Hasan, handles much of the registry's day-to-day operations.

Founded in 1952, the registry grew out of the efforts of Dr. Harriet L. Hardy (February 1970, *MGH News*), an MGH physician who devoted herself to working with occupational disease. Also instrumental in setting up the unit were Dr. Stoeckle, now Director of the MGH Medical Clinics, and Dr. Joseph C. Aub, deceased MGH scientist (March 1974, *MGH News*).

Dr. Hardy was among those who took an early interest in beryllium disease. She first encountered it in the 1940s. Workers in nearby Salem and Ipswich contracted the disorder. Their work in the manufacture of fluorescent light bulbs had exposed them to the metal. Technological advances have since ended this particular use.

When under Dr. Hardy's direction, the registry received monetary support from the A.E.C. Because beryllium is used in some nuclear reactors, many of the commission's own scientists had become afflicted with the disease.

In 1966 when the registry was situated at M.I.T., the A.E.C. terminated its support.

In 1969 the U.S. Public Health Service grant breathed new life into the center. It moved to the MGH under the directorship of Dr. Kazemi.

Today, more active than ever, the registry has become a model for other centers throughout the nation – even for those not interested in occupational disorders. The unit continues its many tasks with the firm belief, as expressed by Dr. Kazemi, that "The whole business of occupational disease is prevention. If preventive measures were taken, we would have no occupational disease."

Quick, Accurate Breast-Cancer Screening

(Concluded from Page 1)

become more frequent. The xeroradiograph's great capacity to show detail makes this possible. In the past year the MGH xeroradiography unit discovered 17 completely unsuspected early breast cancers.

In ordinary X rays, objects such as small tumors sometimes merge into the background. Unlike conventional methods, however, xeroradiography does not employ photographic plates.

Using a special process, it forms a picture on a sheet of paper. This image, in shades of blue, shows the exact location, size, and borders of every object within its frame. A cancerous tumor in its first stages of growth might show up as a tiny blur in ordinary X rays. In a xeroradiogram (page 5, lower picture), it would appear as a dark blue mass with a precise shape and possibly small, easily seen calcifications.

Physicians find the xeroradiogram easier to read. They can interpret the images in one-fifth the time required for ordinary methods.

Until now, the only way to discover cancer in its early stages was to combine X rays with the injection of dyes or radioactive chemicals. These methods are time-consuming; some can cause pain and can add a small element of risk.

Thermography, a radiology technique based on principles of heat, provides a much less detailed picture of breast cancer but has proved useful as a screening procedure.

The xeroradiography breast examination, which includes several views of the breast from different angles, takes about 30 minutes. It requires no hospitalization. Unlike traditional methods which rely on a hard metal or plastic plate to compress the breast, xeroradiography uses a balloon. This eliminates discomfort for the patient.

Although breast disease has absorbed a large chunk of the machine's time, the xeroradiograph at the MGH has been set to other tasks. Among its uses have been tests on bone and neck injuries and diseases, and facial fractures.

The MGH was also the first institution to use the device to examine tendon injuries. With detailed looks at the tough connective tissues, the machine has enabled doctors to determine the exact amount a tendon had swollen when injured. This information previously had been difficult to discover.

Dr. Kalisher regards testing for breast diseases, which makes up 95 percent of the new device's work, as vital. He wants to make the machine available to as many women as possible.

The unit now sees an average of 12 patients a day, and sometimes as many as 16.

"We see two basic types of patients," the unit's director explained, "screening [symptomless] and symptomatic. Screening patients are both directed and nondirected. Nondirected means the door is open for anyone who wishes to come in. She does not need a referring physician. The directed screen is a patient who does not have symptoms but has a family history of breast cancer or has had one breast removed.

"The second group is composed of the symptomatic patient. Her symptoms are usually either pain, lump, or discharge.

"As far as routine screening goes, we'd rather have the patient sent by a physician, but we never turn anyone away. For those aged 40 to 65 we feel routine screening makes sense. In patients younger than 30, we feel it is probably not necessary."

Although the xeroradiography machine requires only one technician to operate, the unit recently acquired a second trained individual to run it. This allows the device to carry a double load of patients.

Dr. Kalisher also feels the xeroradiography unit will save patients money in the future. Conventional methods of breast-cancer screening now require roughly the same fees as the new device. But while other fees seem as low as possible, Dr. Kalisher feels those for the new machine will continue to drop. He believes increased use will lower costs.

Falling costs and increased usefulness have made xeroradiography popular throughout the country. It came into general use, however, only three years ago.

The process itself is almost 40 years old. A patent attorney, Chester Carlson, conceived of the device in 1937. Until the 1950s it went virtually unused. Doctors then began to experiment with it.

Still lacking a collection of the data needed for diagnosis – on when to use the machine and how to interpret its pictures – xeroradiography did not achieve general use until after 1966. In that year a Chicago physician, Dr. John Wolfe, wrote the first complete text as well as numerous papers on the device and is now recognized as the father of xeroradiography.

One of his students was Dr. Kalisher, who brought the device to the MGH six years later.

Many physicians now consider the xeroradiograph one of the most important new diagnostic tools – especially in the detection and evaluation of breast cancer.

Technician Barbara Cornell and Dr. Lester Kalisher, director of the xeroradiography unit, ready the machine for an examination. The balloon-compression method used (note balloon on bottom of device) is more comfortable for the patient than a hard metal or plastic plate.

Dr. Kalisher scrutinizes the examination findings. Doctors can interpret the clear, detailed xeroradiograms in one-fifth the time they need for ordinary X rays.

New X-Ray Device Works Like Copier

The xeroradiographic process involves the use of a specially coated aluminum plate. This coating material, selenium, is "photoconductive" and loses its ability to conduct electricity if exposed to light or X rays. The photoconductive plate, when charged, is extremely sensitive to slight variations in the intensity of such rays.

In xeroradiography the photoconductive plate performs the role which photographic film plays in conventional X rays. The xeroradiography plate, after being electrostatically charged, is placed under the object being X-rayed.

The X rays neutralize the static charge on the plate, producing a latent image of charges. Since some rays are absorbed by the patient's body, the amount reaching the plate varies depending on the tissue density. The more radiation exposure, the greater the charge removed.

A blue-tone powder is dusted over the xeroradiography plate. This powder has an electric charge opposite to that on the plate. Therefore more powder adheres to areas with higher residual charges, similar to iron filings in a magnetic field.

Since solid objects (such as tumors) in the body absorb radiation, the area in their shadow retains more of its static charge thus attracting more powder to the shadowed section.

After the image is developed, it is mechanically transferred to a piece of plastic-coated paper. The finished product is then read for interpretation.

The final image is a map of various shades of blue on white which accurately denotes the anatomy of a portion of the body such as the breast.

The basic process is known interchangeably as xerography or xeroradiography. The image is a xeroradiogram.

Xeroradiogram of a breast. The dark area indicated by the arrow is a cancer. (Original xeroradiogram has blue tone.)

MGH Consolidates Forces to Fight V.D.

A new clinic, designed to meet the venereal-disease epidemic with prompt and thorough treatments while making the experience as smooth as possible for the patient, has opened at the MGH.

The Genito-Infectious Disease (G.I.D.) Clinic, which began operation in November, centralizes in one location all the MGH resources for V.D. treatment. Venereal-disease patients had previously gone to the Urology (for men with gonorrhea), Gynecology (for women with gonorrhea), or Skin L (for both sexes with syphilis) Clinics.

Dr. Harley A. Haynes, Chief of the G.I.D. Clinic and Chief of the MGH Dermatology Clinic, stresses the importance of patient comfort. Because of social attitudes, he pointed out, seeking a cure for venereal disease can be embarrassing. If a patient's clinic visit is smooth, however, he will be more apt to seek further treatment promptly when he needs it.

Under partial state support, first visits and most tests and drugs are free.

Dr. Haynes also emphasized the advantages the clinic offers in employing only personnel trained and primarily interested in venereal disease. The unit thus concentrates a great deal of expertise within easy reach of the patient.

At the clinic, nurses and technical assistants (both female and male) take the patient's history, perform partial physical examinations according to a protocol, do the required tests, and obtain physician consultation when necessary. If there is a lesion which needs examining, a dermatologist expert in venereal disease is on hand to do so. A physician reviews histories and test results and decides on the course of treatment.

One of two nurse epidemiologists, especially trained by the Division of Communicable Diseases, Massachusetts Department of Public Health, interviews each clinic patient for contacts – persons who might have exposed the patient to V.D. or have been exposed by the patient. Mrs. Sherry Coppola, RN, epidemiologist, said the patient's name is always kept confidential when the clinic calls his or her contacts to come in for treatment. She also emphasized that under state law minors can receive V.D. care without parental consent or knowledge.

(See related story on Page 6)

V.D. and the Young: Fire in Dry Brushwood

At 17 years of age pelvic infections, complications of acute, untreated gonorrhea, have hospitalized her four times.

She was 14 the first time. Whenever she contracts gonorrhea, she avoids seeking treatment until her infection becomes serious. She is troubled, has family difficulties and drug problems, and is sexually active.

To her MGH physician, the Boston-area girl is the typical, young unmarried venereal-disease patient. Her personal problems led to the kind of behavior which left her open to V.D.

Her case underlines an important fact: Venereal disease, already a problem of the young, is becoming even more so.

About 75 percent of American V.D. patients are 15 to 29 years old. Those aged 20 to 24 have the greatest incidence of the disorder; 15- to 19-year-olds rank second; and 25- to 29-year-olds, third.

Boston doctors have reported a case of sexually acquired gonorrhea in a six-year-old boy.

These young patients are part of a worldwide V.D. epidemic of astounding proportions. Although there are five venereal diseases, only two, gonorrhea and syphilis, are of major importance, and constitute 95 percent of cases.

In the United States alone, about three million persons will contract gonorrhea in the coming year. The number of new cases is growing by about 15 percent annually. Syphilis in its primary and secondary stages will afflict another 80,000 people. In new cases, it has a two percent annual growth rate.

On the prospects for controlling this epidemic, opinions vary.

Dr. John W. Grover, an MGH gynecologist expert in V.D., believes that because of ignorance it will continue to run rampant for at least a decade. The primary lasting effect, he feels, will be large numbers of Americans made sterile by the complications of untreated gonorrhea.

If left uncared for, gonorrhea can spread to the reproductive organs of an infected person – the male prostate gland or the female tubes and ovaries – and cause permanent damage. Because of difficulty in diagnosing gonorrhea in females and because of certain aspects of their anatomy, the majority of those becoming sterile are women.

Syphilis, though its complications can be far more serious, is considered less of a problem. An internationally known V.D. expert, Dr. Nicholas J. Fiumara, believes that the two percent growth rate of syphilis means it will soon be under control. The Director of the Division of Communicable Diseases of the Massachusetts Department of Public Health, Dr. Fiumara feels that the blood test for the diagnosis of syphilis has made inroads on its spread. The test, he thinks, may even reverse the upward trend in the number of cases.

Dr. Fiumara, who is also Clinical Associate in Dermatology at the MGH and holds appointments at several other Boston institutions, sees no immediate hope, however, for the control of gonorrhea.

For thousands of years no cure for venereal disease existed. Finally in the 1940s penicillin came into use and proved an effective treatment for gonorrhea and syphilis. Doctors believed the diseases would be eradicated. The incidence of V.D. in America fell and in 1957 reached an all-time low. In the following year it began to climb. There ensued an upward spiral which accelerated into the 60s and 70s.

What happened?

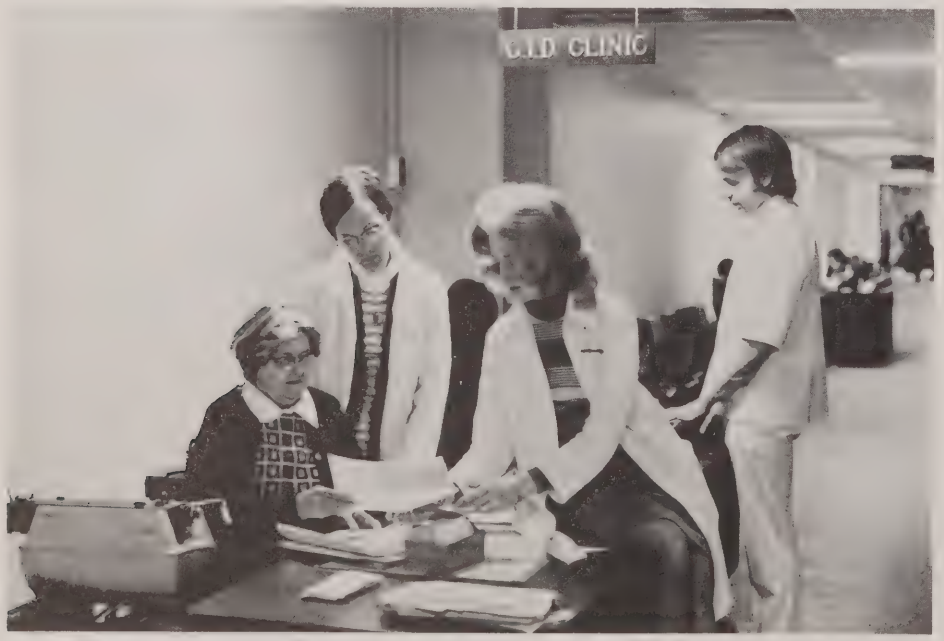
In part, medical factors were involved. A penicillin-insensitive strain of gonorrhea appeared. To some extent medicine simply lacked the resources to meet a massive increase in venereal disease.

Social factors, however, were far more responsible for the epidemic. Among these Dr. Fiumara's Division of Communicable Diseases lists "breaking of previously closed sexual 'circles' by population movement," general public ignorance, and increased sexual activity. The latter, it appears, is a central cause.

Dr. Fiumara believes America has a "sex-centered" culture which has encouraged sexual activity, particularly among the young.

Some feel the Vietnam War contributed to the venereal-disease epidemic in the United States. Vietnam is known to be, as Dr. Grover terms it, "a literal hotbed of V.D." Some also blame the war for the spread of penicillin-insensitive gonorrhea. Vietnam, they feel, with its nonprescription black market for penicillin, has been the ideal setting for the development of these strains. If an individual attempts to treat himself without medical supervision, he may receive an inadequate dose of the drug, and the gonococcus (gonorrhea-causing organism) may find a way to live with penicillin.

Although antibiotics allow physicians to cure venereal disease effec-



Nurses of the Genito-Infectious Disease Clinic, Pamela Miles, RN (standing, with glasses), and Sherry Coppola, RN, ask secretary Agnes Hayes (left) to order a blood test while Technical Assistant Michael Colton waits at right.

tively, the onslaught of the epidemic has caught medicine with one arm pinioned behind its back. This is the arm of prevention.

"Medicine," Dr. Fiumara emphasized, "has no good prevention for V.D."

Prevention, including immunization, he asserts, is a long way off: "A vaccine for venereal disease is in the distant future, perhaps not in our lifetime."

A number of preventive measures have been used in the past.

"There are ways of reducing the risk of disease," Dr. Grover said. "Any kind of mechanical or chemical effort made by people who are sexually active can help reduce the incidence of infection.

"If you use a contraceptive jelly in the vagina, it will help. The same is true of using a diaphragm. Those methods will lower the incidence of cases in a given number of exposures. Even simple measures, such as urinating or washing carefully after intercourse, will help reduce the chances of transmission."

Dr. Fiumara cautioned, however, that these methods are not completely protective. The condom in particular, he warned, long thought to be a good device for prevention, is far from it. If sexual partners fail to use the condom during presexual play, he holds, the device will not shelter anyone from infection.

The chemical method of prophylaxis, Dr. Fiumara said, was used by the military but never gained civilian acceptance. Within two hours of contact the individual using this method must apply a foam to the site of possible infection.

Researchers are now trying to develop a vaginal cream to serve as both a preventive for V.D. and a contraceptive.

Medicine is hampered by more than the lack of preventive measures. Difficulty in diagnosing gonorrhea in women and men has added to the problems of V.D. control.

For one thing, 75 percent of women infected with this ailment lack symptoms. Yet they can transmit the infection to others. Even when they do have signs, they may not notice them. Symptoms are internal and may require a pelvic examination to detect.

For diagnosis of gonorrhea in female patients, doctors use cultures and vaginal smears. They are the best methods known but are not completely reliable.

(Concluded on Page 8)

How to Recognize Venereal Disease

There are five venereal diseases: gonorrhea, syphilis, granuloma inguinale, lymphogranuloma venereum, and chancroid. Only the first two, however, are major contributors to the V.D. epidemic. Their symptoms and treatment are described here in detail.

Venereal disease is almost invariably transmitted by sexual contact. Cases of chancroid and acquired syphilis have on rare occasions occurred through other means.

Gonorrhea's symptoms are usually difficult for males to ignore. Within 5 to 15 days of infection, they suffer burning on urination and dripping discharge from the penis. Occasionally a male patient may carry the disease but have no symptoms. For males, a urethral smear will confirm the diagnosis.

Female patients often lack symptoms. For those having them, the signs are much like those of the male – burning urinations and inflammation of the vagina.

Women are more likely to have complications than men. Gonorrhea can spread to the tubes and ovaries and cause sterility. A pelvic infection can also result. Though it occurs less frequently, untreated gonorrhea can cause sterility in males by infecting the prostate gland. The uncared-for condition can afflict the joints, causing gonococcal arthritis.

If a female is exposed to gonorrhea once, she has a 4 in 10 chance of contracting it. For a man the chances are 6 in 10. The acidity of the vagina makes it difficult for the fragile gonococci (causative organisms) to survive, accounting for the different figures.

Syphilis comes in three stages. The first, or primary, appears about 30 to 60 days after transmission. It first shows itself as a painless ulcer, or chancre. This comes at the site of initial infection, usually somewhere in the genital area. The chancre then clears up.

Secondary syphilis follows two or three months later. The infected person feels ill and has a rash which can occur on any area of the body. When this stage ends, a latent period of months or even years follows.

The third or tertiary stage does the most damage. The spirochete, the syphilis-causing organism, collects in organs throughout the body, where it begins to inflict irreparable destruction. This may include the brain, heart, and spinal cord.

A blood serum (serologic) test can accurately diagnose syphilis.

Whether male or female, each person has a 60 to 75 percent chance of acquiring syphilis through a single exposure.

The Chief of the G.I.D. Clinic, Dr. Harley A. Haynes, reviews blood-test results with Mrs. Coppola and determines the course of treatment.

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Generation Gap Hampering V.D. Education?

(Concluded from Page 7)

Dr. Fiumara believes that a dependable blood test for gonorrhea similar to that for syphilis may some day remedy this problem.

Because there are difficulties in diagnosis and prevention of V.D., efforts at halting the epidemic have turned to nonmedical measures. There are different views about which of these approaches is best.

Dr. Grover believes that education is the key.

"It is important," he said "to educate young people properly about venereal disease so that regardless of their sexual behavior they at least have information about the risks of their actions. If they have some knowledge of these risks, they can do something to prevent the transmission of the disease or can seek treatment early."

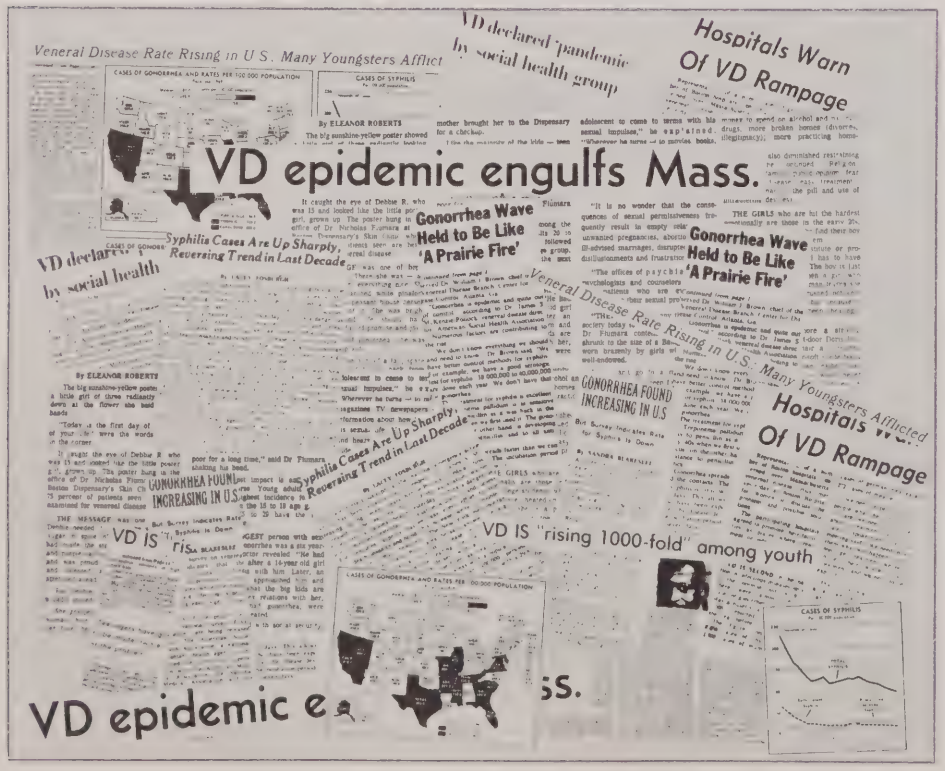
Informed individuals, Dr. Grover stated, can act responsibly to avoid spreading V.D.

He contends that schools and educational authorities have dragged their feet on the development of programs to teach young persons about venereal disease. They are afraid to move ahead, he said, because of pressure from the general community.

"I think that this results from a cultural gap that exists between parents and teen-age children," Dr. Grover said.

"The teen-age group is increasing its sexual activity and its risk of acquiring venereal disease. Yet their parents are almost two generations behind in their attitudes toward sexual behavior. The parents are thus reluctant to accept the fact that their children need to be educated about these matters."

Dr. Fiumara also sees education as an important part of V.D. prevention.


Venereal Disease Rate Rising in U.S. Many Youngsters Afflict
VD declared 'pandemic' by social health group
Hospitals Warn Of VD Rampage
VD epidemic engulfs Mass.
Gonorrhea Wave Held to Be Like 'A Prairie Fire'
Syphilis Cases Are Up Sharply, Reversing Trend in Last Decade
GONORRHEA FOUND INCREASING IN U.S.
VD IS "rising 1000-fold" among youth

But he feels education will not provide the complete answer. The ultimate control of venereal disease, he argues, must come from changed attitudes of society about sex. Discouraging the widespread casual sexual activity, he believes, is not the task of medicine.

"The medical profession is nonjudgmental," he said. "If we were to make judgments, we would discourage patients from coming for treatment, which means that the disease would spread even further in the community."

He charges social and religious leaders with the responsibility of changing social attitudes.

Dr. Grover, as part of his views on venereal-disease education, believes doctors should be trained to screen for the disorders.

"I think that every female patient in a doctor's office," he said, "particularly if she is of childbearing age or the teen-age group, and sexually active, should have periodic cultures for gonorrhea and blood tests for syphilis."

Dr. Fiumara is not as enthusiastic about screening. During the last year his division tested 60,000 women, aged 15 to 29, for venereal disease. Such testing, however, Dr. Fiumara argued, will not be completely effective until there is a reliable blood test for gonorrhea.

Both Drs. Fiumara and Grover would like the federal government to spend more money to aid in V.D. control. Dr. Fiumara pointed to a shortage of doctors trained to specialize in venereal disease. He called for more training grants. He also stated that there is a serious lack of federal funding for V.D. research.

Through the beliefs of Drs. Fiumara and Grover runs one clear thread. Both see V.D. control as tied to the way each person behaves. They view it as each person's responsibility to avoid contracting venereal disease, to seek treatment if he should get it, and to be careful not to spread it to others.

MGH News

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Imperiled by Fire, Rescued by Parent's Skin

Finding Bone Cancer with New Compound

(Second of a series on radiology)

Chance encounter sparked its discovery.

The relentless curiosity of two researchers provided the fuel.

And today, a new compound used in radiological scans to detect bone disease has the potential of benefiting many of the estimated half million Americans who suffer each year from new cases of cancer which could involve the skeletal system.

The name of the new scanning agent is a mouthful: technetium-99m-labeled 1-hydroxy-ethylidene-1, 1-disodium phosphonate. In short form: either technetium-99m-diphosphonate, or ^{99m}Tc-HEDSPA.

It was unearthed three years ago by Frank P. Castronovo, Jr., Ph.D., a specialist in radiopharmacology, and Ronald J. Callahan, M.S., a radiopharmacist, both working in the MGH Department of Radiology, Division of Nuclear Medicine.

In two years of subsequent use at the MGH, bone scans with the new agent to evaluate the spread of cancer to the skeletal system have been obtained in over 1,900 patients.

Similar to an X-ray examination, a scan involves using a device which detects the emissions of radioactive material from within the patient's body and transcribes this information onto film for interpretation.

When used in determining the spread of cancerous growth, ^{99m}Tc-HEDSPA has proven more sensitive than ordinary X rays and less costly than previous scanning agents.

The compound's ability to detect early cancerous spread is valuable in helping doctors decide whether or not to perform surgery to remove the original growth. If the cancer is completely localized in one area, surgeons usually proceed to excise it. If there is distant spread, radical surgery would in most cases not cure the patient. Doctors would then attempt to treat the illness in general rather than the primary tumor.

(Continued on Page 2)

Jean . . . She survived burns covering 91 percent of her body — 80 percent third degree.

Reaching across the kitchen stove to a countertop, Jean brushed a lighted burner with her sleeve. In a flash, it ignited.

Silent with terror, the 2½-year-old New York youngster stood motionless as flames devoured her highly flammable coat.

Her 10-year-old brother entered seconds later. Shouting for his mother's help, he desperately tried to douse the flames with water from the sink. Jean's mother dashed in and managed to extinguish the fire.

Rushed to a nearby hospital, Jean had burns over 91 percent of her body. Deep third-degree burns covered 80 percent.

No child as young as Jean had been known to survive with burns so severe. Looking for some way to improve her chances, the girl's physician telephoned the Shriners Burns Institute in Boston.

Within 48 hours of those fiery seconds in a New York kitchen, a private plane delivered Jean to the Institute.

Six months later, in September 1972, she walked out of the hospital with her mother.

What had saved her life was an experimental new treatment for children with extremely severe burns. Designed to treat patients whose burns would otherwise have meant almost certain death, the technique is a cooperative effort. On one hand: the MGH surgeons and pediatricians who staff the Shriners, led by its Chief, Dr. John F. Burke. On the other: the doctors of the MGH Transplantation Unit, under Drs. Paul S. Russell and A. Benedict Cosimi.

(Continued on Page 4)

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EDITORIAL:

What's in an "A"?

Orthopedist or orthopaedist? That is a question which has been threatening to cause armed warfare between the Department of Orthopedics – or is it Orthopaedics – and the News Office, which publishes the *MGH News*. Dr. Henry J. Mankin, Chief of the Department, is a purist. He notes that the word orthopedics comes from the Greek words orthos, meaning straight, and paede, meaning child. Etymologically speaking, an orthopedist, therefore, is one who straightens (the bones of) children. Since the original Greek word for child has an "a," Dr. Mankin argues that the word orthopedic should be spelled orthopaedic. In fact without the "a" the corrupted Greek word evolves into the Latin word for foot. From the strict viewpoint of word origins, Dr. Mankin is correct. And the hospital's Board of Trustees conceded the point by officially putting the "a" back into the Department of Orthopaedics.

Now the *MGH News* recognizes the legality of the change. But it remembers a mild flurry of objections that attended its use several years ago of an extra "a" in the word an(a)esthesia. Rather than persist, it dropped the archaic "a" and eliminated a source of misunderstanding for the readers. When Dr. Mankin succeeded in turning the spelling of his department's name into a sort of saber-toothed tiger, the *News* recalled the anaesthesia dinosaur and ignored the anachronistic spelling. But Dr. Mankin's persistence has carried the day. He has trained a barrage of unrelenting artillery fire on the Golan Heights of the News Office. Now the latter has decided on a strategic withdrawal. Henceforth the *News* will refer to the Department of Orthopaedics. In support of a decision made under duress of missives rather than missiles, we rationalize that a proper name should be spelled according to whatever is legally correct.

That still leaves us with the question of how to spell the term when not part of a legally constituted name. Should it be orthopedics or orthopaedics? Orthopedist or orthopaedist? While we hate to be schizoid, we must remain as puristic as Dr. Mankin himself. Webster's Third International gives orthopedist and orthopedic as the primary spellings and the "a" forms as secondary. Therefore Dr. Mankin will be the orthopedic surgeon who directs the Department of Orthopaedics. Should he decide to attack the ultimate bastion itself, Merriam-Webster, we have no doubt that one day Dr. Mankin will become an orthopaedist. And it might even be possible for his colleagues who treat children to become p*a*ediatricians.

Chance Delivered Bone-Seeking Part Of New Compound

(Continued from Page 1)

Discovery of the scanning agent has attracted worldwide attention. Inquiries about the compound have poured into the MGH Division of Nuclear Medicine from such diverse locations as New Zealand and India. When visiting the MGH in November 1973, a group of mainland Chinese physicians requested information on ^{99m}Tc-HEDSPA. Dr. Castronovo, who speaks some Mandarin Chinese, answered their questions without the aid of an interpreter.

The scanning agent itself is a marriage of two uniquely useful materials. One is the bone-seeking chemical diphosphonate. When originally discovered, it was used as an ingredient of soaps and detergents, effective against scaling and corrosion.

Diphosphonate's partner, technetium-99m, is a radionuclide. Its unstable nuclei, the central portions of each atom, emit gamma ray radiation which can be detected from within the body by sensitive measuring instruments known as gamma cameras and rectilinear scanners.

The origins of the radionuclide are somewhat sinister. It is a by-product of nuclear fission, the splitting of the atom. The discovery may well be described in a document marked "Top Secret." Scientists may first have noticed it during the Manhattan Project, which produced America's first atomic bomb.

Had it not been for MGH matchmakers Dr. Castronovo and Mr. Callahan, this unlikely chemical pair of radionuclide and diphosphonate might never have come together.

Both men had long searched for a superior radiopharmaceutical for bone scanning. Such a substance, they realized, would probably be a compound of two materials, one radioactive and the other bone-seeking.

From the start, they had identified technetium-99m as one of the partners. This radionuclide had already been combined with other chemicals for use in diagnosing diseases in the lung, liver, and brain, to name a few.

To Mr. Callahan and Dr. Castronovo, technetium-99m has ideal char-

acteristics for detection with scanning instruments. It has a half-life of six hours. It takes that much time for half of a given amount of material to lose its radioactivity. This allows the physician sufficient time to complete a scan without exposing the patient to excessive radiation.

"At that time, however, available radiopharmaceuticals labeled with ^{99m}Tc had one vital flaw," Dr. Castronovo said. "They didn't possess skeletal-seeking properties." The investigators thus carried on a relentless search for the necessary bone-seeking mate for technetium.

One day in early 1971, chance delivered the object of their quest. Mr. Callahan happened to attend an MGH discussion on bone disease. One physician talked about an oral medication used to treat a particular skeletal ailment. After administration, the drug was said to concentrate on bone. By linking with the "hydroxyapatite" crystals of the bone, the drug inhibits growth – including diseased growth. Mr. Callahan jotted down the name: diphosphonate.

Later, on looking up its chemical structure, Dr. Castronovo and Mr. Callahan saw that it could be chemically attached to technetium-99m. Their work had just begun.

It took Dr. Castronovo two months to synthesize diphosphonate in his laboratory. With the help of Mr. Callahan, technetium-99m was attached to diphosphonate's structure. Months of tests followed.

At first, the investigators had to determine whether their newly formulated scanning agent would concentrate on bone. They injected rabbits with the mixture.

"With computer analysis," Dr. Castronovo explained, "we measured the rate of the compound's disappearance from tissue and its accumulation on bone."

When first injected, the compound, as detected by a gamma camera and measured by computer, flooded the rabbit's entire body. In half an hour, however, the ^{99m}Tc-HEDSPA revealed the complete skeletal structure of the animal. Smaller amounts came to rest in the kidneys and bladder, but the agent was so far successful.

"The next step," Dr. Castronovo said, "was to determine if the amount of technetium-99m-diphosphonate intended for patient use would be chemically toxic after injection. We injected animals with fantastic amounts – considerably more than a patient would receive. A patient gets about half a milligram, representing a sizable safety factor relative to animal toxicity studies."

In this case, the patient receives about 1/20,000 the maximum safe dose.

Then came the ultimate trial: Would the new compound provide accurate diagnoses?

In the MGH Department of Radiology, Division of Nuclear Medicine, Drs. Henry P. Pendergrass, Majic S. Potsaid, and Kenneth A. McKusick have all been closely involved in the clinical evaluation of the new radiopharmaceutical.

"We first used the new agent in patients with known disease," said Dr. Castronovo, Instructor in Radiology at Harvard Medical School, "and compared the results with those of scans with fluorine-18, which was then the radiopharmaceutical used for bone studies at the MGH. After determining that the ^{99m}Tc-diphosphonate scans were acceptable, the nuclear medicine physicians decided the new compound could be used on a regular basis."

Technetium-99m-diphosphonate's commonly used predecessor, fluorine-18, is a radioactive and bone-seeking element. It is produced in a device known as a cyclotron. The cyclotron has a chamber in which it forms radionuclides by bombarding chemical elements with atomic particles accelerated to extremely high speeds.

Although the MGH has such a machine, few other hospitals do, forcing them to obtain fluorine-18 elsewhere. Even at the MGH, fluorine-18 cannot be made every day since the cyclotron has a heavy schedule for many other nuclear medicine tasks. Fluorine-18 can only be produced at certain times, and since it has a half-life of only 110 minutes, must be used right away.

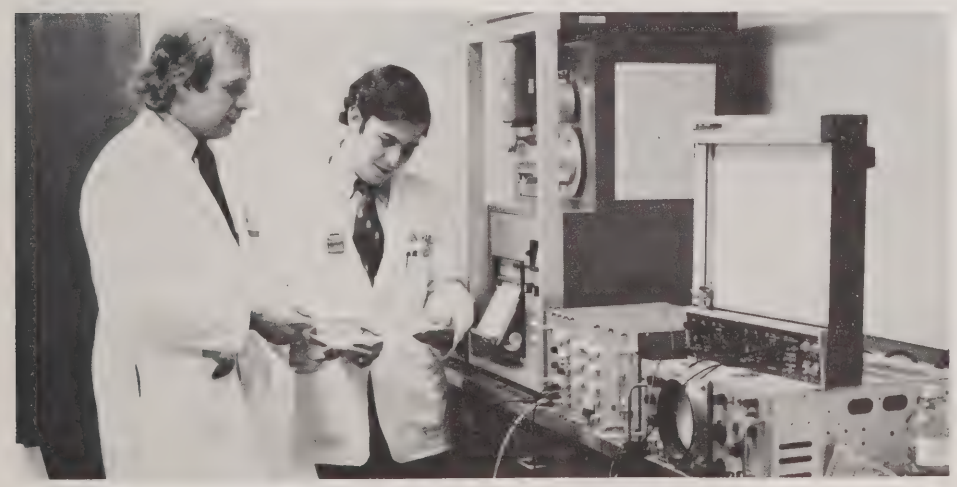
Technetium, on the other hand, can be generated daily from a simple device, roughly resembling a fire hydrant in size and shape, and costing relatively little.

The new scanning agent does have one drawback. The bony areas where it concentrates are not always diseased. In young patients, for example, the compound accumulates in areas of normal skeletal growth. Fractures also attract the compound.

This deficiency explains why the substance is better for detecting the spread of cancer than it is for initial screening. Were it used for screening, it might suggest disease where none is present. If doctors know that a patient already has disease, however, technetium-99m-diphosphonate is a valuable tool in determining its extent.

Nuclear medicine doctors use a special technique in reading scan results. (See photograph on page 8.) They compare readings from bones on opposite sides of the skeleton. If both sides show similar radiopharmaceutical concentrations (symmetrical uptake), then the doctors assume the area scanned is not diseased. If either side of the skeleton shows different concentrations of the scanning agent (asymmetrical uptake), these bony areas are potentially diseased.

The new compound, Dr. Pendergrass declared, "is the most sensitive and accurate tool we have today to map out possible pathological [diseased] areas in the skeleton of a patient."



The developers of technetium-99m-diphosphonate, Frank P. Castronovo, Jr., Ph.D., and Ronald J. Callahan, check a readout from an apparatus used to test the quality of the scanning agent.

Drug Slows Child's Rejection of Skin

(Continued from Page 1)

The treatment involves temporary skin transplants for periods as long as eight weeks. By closing the wounds with transplanted skin from a donor, the physicians seek to protect the burned children until grafts from their own unharmed portions of skin can be transferred. The donors of the transplanted skin are usually the children's parents.

By early 1974, 11 youngsters had received such transplants. All had burns which virtually ruled out their survival if treated by any other method. Seven youngsters lived. The eldest was seven. The first treated, and the youngest and most severely burned survivor, was 2½-year-old Jean.

Skin transplants for burned patients are nothing new. For years doctors have used cadaver skin, either as a biological dressing for periods up to 48 hours or as a true graft which may persist for as long as two weeks before it is rejected. In a true graft, blood vessels grow, connecting the skin and the patient's underlying tissue. More recently, the tissue-matched skin of parents, siblings, or other close relatives has been used, but the prolongation of survival is disappointing. The Shriners-MGH technique, however, includes important new elements.

Most significant is the use of immunosuppression. With daily medication doctors suppress the children's immunologic responses which are believed responsible for their bodies' rejection of foreign tissue. This treatment greatly prolongs the length of survival or "survival time" of the temporary graft. With the extra time doctors can cover the most badly burned child with his own skin.

Dr. Alia Y. Antoon, a Shriner's pediatrician, explained why such skin closure is vital: "The major causes of death in burned children are severe malnutrition and infection. Malnutrition occurs because of the great increase in metabolic rate which persists as long as there are uncovered areas of the body. Since the child is in a weakened state, loses his appetite, and is without the normal protection of skin, he is also more vulnerable to infection.

"He cannot build either new antibody protein or protein for healing without both large food supplies [building materials] and effective means of reducing the elevated metabolic rate."

In order to effectively fight infections and prevent loss of body fluids, skin closure must be continuous. Covering patients sufficiently with their own skin requires several weeks or more. Since patients with large burns have few areas of healthy skin remaining, surgeons must continually reharvest these patches, allowing them 10 to 14 days to grow back each time.

Immunosuppression is considered risky because suppressing the immunity of burned children further lowers their defenses against infection. Still, the patients have almost no chance of survival with traditional treatments.

At the Shriners, doctors have a unit they believe makes immunosuppression safe enough to attempt. Burn patients spend the most serious part of their illness in a special intensive-care facility known as the "bacteria-controlled nursing environment."

With sterile air flowing from ceiling to floor and plastic curtains on all sides, this unit maintains the best conditions for conserving the vitally needed energy of the burned youngster – a temperature of 88 degrees and relative humidity of 86 percent.

The Shriners built this unit in the late 1960s. The hospital, Dr. Burke said, had anticipated the need for such an environment when using skin transplants.

Without this kind of facility, the Shriners doctors feel, their technique would not be possible.

Because the physicians believe there is still some risk in immunosuppression, they have placed limits on the use of the new treatment. Only children with 80 percent or more total body-surface burns and 70 percent or more third-degree burns receive it.

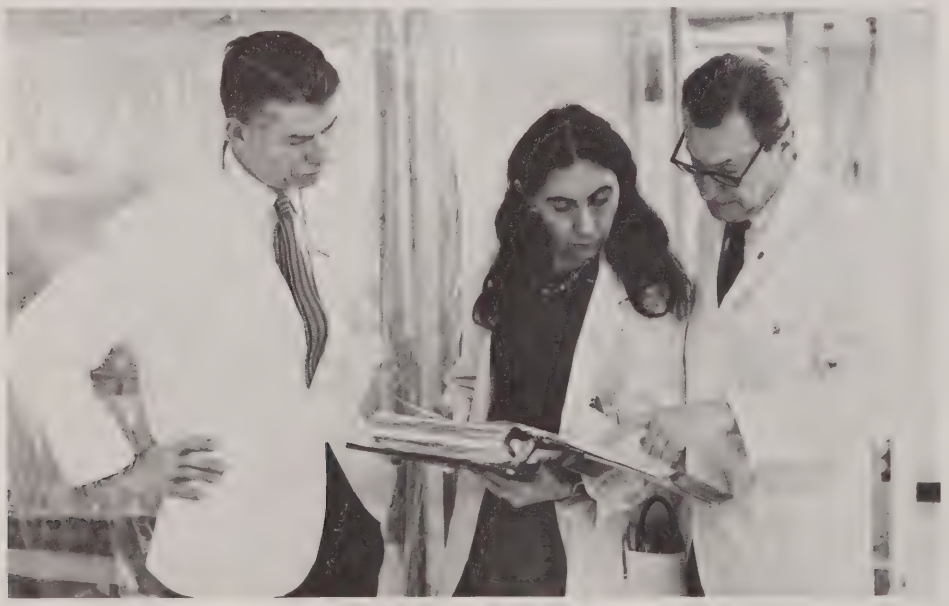
When one of these critically burned children enters the Shriners, he is prepared for surgery. In the interim, if the parents are willing, doctors can take samples of the blood of the mother, father, sisters, and brothers using the white blood cells for tissue typing.

An MGH Blood Bank laboratory, headed by Dr. Thomas C. Fuller, determines which parent or other relative shares the greatest number of common antigens with the child. Antigens are the agents which trigger the rejection response. If any antigens in the donated skin are the same as the child's, his body "recognizes" them and does not reject them.

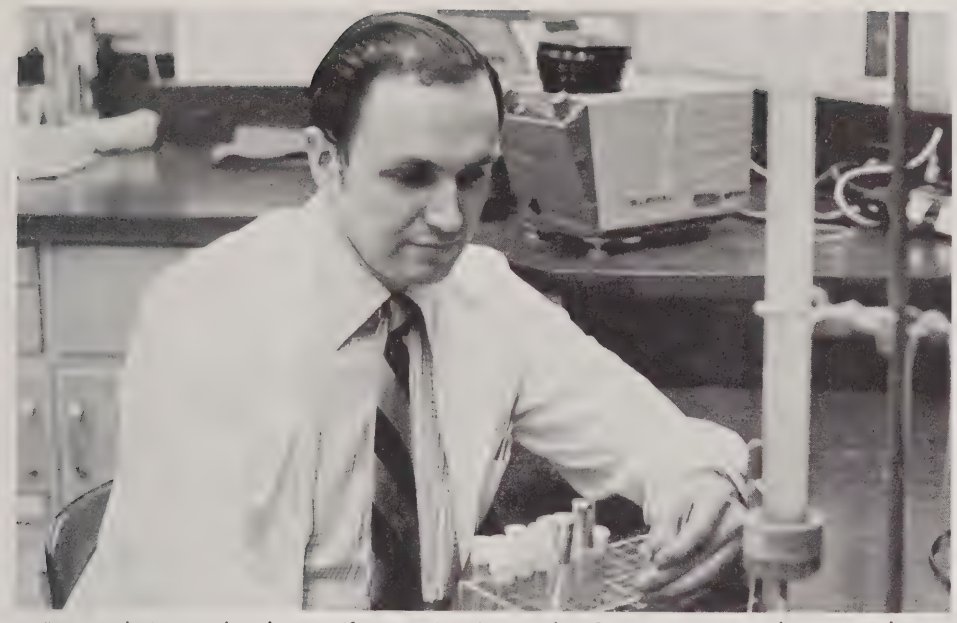
Only four types of antigens in the skin or other tissues are of prime importance to transplantation when immunosuppression is employed. There may be a hundred or so more which, except in cases of identical twins, would make matching almost impossible.

When the potential donors are typed and the child prepared, a difficult stage of the technique is reached: deciding whether or not to use the treatment.

This task usually falls ultimately to Dr. John D. Crawford, the Shriner's Chief of Pediatrics, who as each child's



Standing before one of the "bacteria-controlled nursing environments" designed to protect the burned child from infection, Drs. John D. Crawford, left, Alia Y. Antoon, and John F. Burke examine a child's record.



From a device employed in purifying it, Dr. A. Benedict Cosimi removes medication used to "immunosuppress" burned children and hinder their rejection of transplanted skin.

advocate, keeps special watch over the interests of patient and family.

Dr. Crawford, also Chief of the Endocrine and Metabolic Unit of the MGH Children's Service, explained that many complex factors enter into the decision of whether to carry out the transplant. The MGH Subcommittee on Human Studies has listed a number of requirements.

The parent's health is one. Though usually small, some risk exists for the skin donor. Surgeons take patches of skin, eight one thousandths of an inch thick, from the donor's thighs. This at first leaves an open wound. Resembling a burn in many ways, the wound is painful and might become infected. And the donor must spend about ten days in the hospital.

"We have turned down some parents as donors," said Dr. Burke, Associate Professor of Surgery at Harvard Medical School, "because they had disease which we thought made the operative risk more than they should take."

A parent's wish to decline the treatment is always strictly abided by, Dr. Crawford stated. "All lights must be green," he said, "for the treatment to go ahead. One red light, whether from donor or doctor, stops the transplant.

"The only difference between the doctor's and the donor's red lights is that the doctor has to answer all the questions, while the donor never has to explain a negative decision."

If a transplant gets the go-ahead, surgeons remove the child's burned tissue at once. Skin, subcutaneous (beneath the skin) fat, and the fascia (a film of tissue under the fat) may all have to come off before exposing the uninjured tissue underneath. The surgeons then graft on the donor skin.

At the same time, the youngster begins to receive immunosuppression. The MGH Transplant Group, under Dr. Russell, manages the program of medication.

Dr. Cosimi and Dr. John D. Whelchel, the MGH surgeons directing its use in severely burned patients, closely monitor the progress of each child. The doctors attempt to maintain just enough immunosuppression to hinder rejection but not enough to invite infection. Patients get partial, not total, immunosuppression.

Although all 11 children had bacterial infections, the doctors believe immunosuppression did not cause them. That they did have infections indicates that it is still impossible to eliminate this problem, even in a special bacteria-controlled unit.

Among burn patients such infections are common. Only if they get out of control, however, do they mean immediate danger. This occurred in one of the four children who failed to survive. The other three had lung difficulties following inhalation burns.

"We had to consider the undeniable risks of using immunosuppression before starting the program," said Dr. Cosimi, Instructor in Surgery at Harvard Medical School. "That's why we only applied it to patients we thought had no chance of survival by conventional methods."

In addition to immunosuppression the children are maintained on "hyperalimentation" (June-August 1973, *MGH News*) when needed. This is a special feeding technique, pioneered in part by the MGH and designed to supply patients with protein when they cannot eat enough. Burn patients need extraordinarily high caloric intake to replace the vast amounts consumed by loss of body heat through open wounds. The Shriners children also receive frozen red blood cells and plasma from the MGH Blood Bank.

During the four to eight weeks when the youngsters are carrying their parents' skin, surgeons continually replace it with sections of the children's own skin.

"When we have covered all but 20 percent of the child's burns with his own skin," said Dr. Antoon, Instructor in Pediatrics at Harvard Medical School, "we stop immunosuppression and continue using allografts [cadaver skin] until we have grafted the patient's skin to all the remaining parts of his body."

The child remains in the bacteria-controlled unit for about three months. Soon after leaving it, he begins to undergo reconstructive plastic surgery. Despite what many believe, Dr. Crawford, Associate Professor of Medicine at Harvard Medical School, pointed out that plastic surgery cannot achieve total repair. "These children," he said, "suffer an extraordinary amount of disfigurement."

Not until some six or seven months after admission can the patient leave the hospital.

The early results of using their new technique have encouraged the Shriners-MGH physicians. They have reported results of their first three cases in the January 31 issue of the *New England Journal of Medicine.*

Recently, in a two-year follow-up, they saw the treatment's first beneficiary, Jean. The New York girl, now four and a half, was about to start nursery school.

"I think this kind of treatment for burns," Dr. Burke said, "is going to be increasingly effective as we learn more about the problems of immunosuppression and transplantation and how to avoid difficulties. We will be able to make this a reasonably safe procedure. Then we can extend it to patients having less severe burns."

Rehabilitation Therapy: "A Help Along the Way"

The young man's automobile skids on an icy patch and crashes. An ambulance rushes him to the hospital. Surgeons perform a delicate operation.

But will the motorist be able to return to his car, to his job, or even to the basic functions of getting up and dressed in the morning?

After surgeons have done all they can to repair the injured body, another kind of effort is needed if the patient is to recover to his fullest capacity. This is the goal of the hospital's Rehabilitation Service (October 1972, *MGH News*), a large team of varied specialists headed by Dr. Robert D. Leffert.

Two key members of the team, the physical and occupational therapist, work hand in hand, the one to improve strength and coordination, the other to teach practical skills.

The physical therapist applies physical means – heat, cold, massage, and above all, exercise – to coax the disabled body back to use. The basic principles were introduced in America by Mary MacMillan, a "reconstruction aide" in England during World War I.

With the accumulation of experience and the advance of research in neurology and kinesiology (the science of movement), physical therapy has become a refined skill.

"The patient is no longer just an arm or a leg," said Miss Marjorie K. Ionta, Supervisor of the Physical Therapy Department. "All motions are interconnected. The healthy person doesn't notice the many combinations which form a single movement. In the disabled person these combinations have to be retrained."

Studies of an infant's first movements have increased awareness of the step-by-step development of motor skills. "We try to recapitulate the normal sequence of this development," Miss Ionta said.

The patient referred for therapy may be disabled by anything from a pain or strain to a serious disorder of the neuromuscular system. Commonly treated are persons with burns, strokes, lung disease, neurological problems such as spinal-cord injuries, and orthopedic problems such as fractures and scoliosis (lateral curvature of the spine).

To determine the patient's needs, the therapist consults with doctors and examines their reports, explores the patient's habits and activities, and by a series of tests evaluates his present level of performance.

"Some physical therapy units have very strict regimens," Miss Ionta said, "but we believe that each patient must be assessed as an individual. Among four or five people with low-back pain, none may receive exactly the same kind of treatment."

Suzanne Scarpulla, physical therapist, resists the balance of Vasco Rocha, an amputee, to prepare him for walking.

The threefold purpose of reducing pain, strengthening muscles, and teaching simple functions figures into the regimen prescribed. "If we can lessen discomfort first, we have gained the confidence of the patient," Miss Ionta said.

For centuries those suffering from pain have instinctively sought the healing powers of heat in hot springs and sunny resorts.

Now whirlpool baths and sun and heat lamps speed healing by increasing circulation. An arthritic hand dipped in warm paraffin and oil will find comfort in a heat-retaining wax glove. Ultrasound treatment, using sound waves at an inaudible frequency, produces heat below the skin surface in the inflamed nerve, muscle, or joint.

The application of cold reduces swelling and helps prevent bleeding. Massage, which may reduce muscle spasm, has psychological value from the age-old spiritual art of the "laying on of hands."

By far the greatest portion of a patient's treatment is exercise. Exercises may be isotonic, when joints are moved with muscle contraction (as in running), or isometric, involving no joint movement (as in pushing against a wall).

In exercises the therapist may initiate movement of the limb. More likely the patient is active with the therapist assisting, or even resisting, to increase strength. The patient may also work with parallel bars, pulleys, weights, and the like.

Miss Ionta prefers not to rely on the elaborate equipment used at some physical therapy centers. The skilled therapist, she believes, can provide more precise treatment.

Home base for the hospital's physical (and occupational) therapists is the Rehabilitation Unit on the first floor of the Vincent-Burnham Building. They may have permanent or temporary assignments in the orthopedic, neurology, burn, and kidney units, the anesthesia department for chest therapy, and the rehabilitation floor for patients needing long-term care.

The rotation encourages growth and development for the staff. "It's like learning a sport," said Miss Ionta, who taught physical education for five years

before studying physical therapy at Harvard Medical School. "Repeated practice brings skills to the therapist. Each becomes specialized in the area she likes best."

Like an athlete, the therapist must be well coordinated with a natural "kinesthetic awareness." A grounding in the medical sciences, a standard examination, and patient-care experience prepare her for the physical therapy license.

Sensitivity to the patient's attitude is also important. "A motivated patient is a joy to work with," said Miss Ionta, "but some have feelings of anger about their situation, and these feelings must be dealt with."

Physical therapy can provide the means and motivation for a patient to expand his capabilities. "It's not a cure," Miss Ionta stressed, "just a help along the way."

* * *

Does occupational therapy take up where physical therapy leaves off? Not exactly. Both evaluate and help develop the strength, skill, and coordination of the disabled patient.

But the occupational therapist concentrates on the patient's practical manipulation of his environment. While the physical therapist, for example, may strive to increase range of motion and strength of an injured hand, the occupational therapist may teach the patient to develop fine coordination with a hammer and screwdriver.

"We work very closely with the physical therapist so that we can be in unison in our approach to a patient," said Mrs. Grania Fishwick, Supervisor of the Occupational Therapy Department.

Learning to use tools with his prosthesis is important to Chuck Stella, 16, who wants to be an auto mechanic. Paula Habecker, occupational therapist, gives guidance.

The goal is the patient's independence; the path varies according to each individual's previous life-style.

"The first contact may be getting to know the patient," Mrs. Fishwick said. "To be actively involved in his program, he must be ready both psychologically and physically."

The goals of therapy are determined by a careful evaluation of the patient's motor and sensory functions. If the patient has had a stroke, a perceptual evaluation is also necessary, as the brain may misinterpret sensory stimuli. The therapist needs to know how the deficits interfere with function.

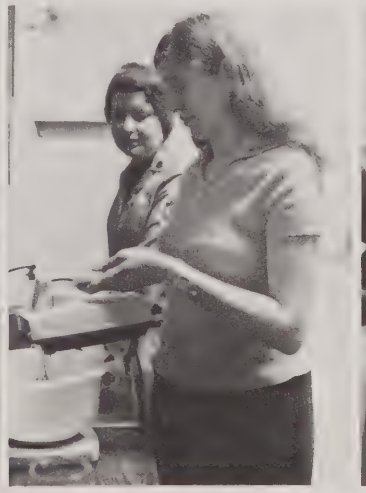
In evaluating disabilities, the therapist must also determine the patient's abilities – and make him aware of them. "The way we explain occupational therapy to a patient is important," Mrs. Fishwick said. "There is a difference between just keeping busy and really striving to reach a goal."

A patient may be treated on the ward or in the occupational therapy department, where real-life environments are created for practicing the activities of daily living. He may learn to handle a mixer in the kitchen or carpenters' tools in the workshop.

(Concluded on Page 8)

Marjorie K. Ionta, left, Supervisor of the Physical Therapy Department, and Sandra Goldberg, therapist, discuss an exercise to improve the stability of Joan Sanders.

With Thomas Holland, physical therapist, directing, Manuel Loura practices dribbling a five-pound "medicine ball."



In the Occupational Therapy Department's kitchen, Sybil Mielnicki, who has had a stroke, learns to use a mixer with the guidance of Grania Fishwick, Supervisor of the Department.

James Sellers, occupational therapist, puts the finishing touches on a splint. Paula Habecker, therapist, acts as patient.

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Developing Strength, Skill, and Coordination

(Concluded from Page 7)

Techniques of self-care – feeding, washing, dressing – are put in the context of self-pride. Vital to the resocializing process is the relearning of communication skills – writing, typing, telephoning, and handling money and transportation.

An important part of treatment is teaching a patient to control his prosthesis. The occupational therapist concentrates on the upper extremity prosthesis that must do the arm's or hand's work in manipulating objects. Special adaptive equipment may be designed to give patients independence in any activity.

"The therapist must meet the patient at his own level and teach him creatively," Mrs. Fishwick said. "She may design special clothing or mechanisms suited to the patient's individual needs."

The multifaceted activities of the occupational therapist at the MGH reflect the diversity of patients referred from clinics and physicians throughout the hospital.

"We're in a very fortunate position because of the variety of specialists and patients," Mrs. Fishwick said. "We have an opportunity to develop expertise in many areas."

The MGH Hand Service, organized in the spring of 1972, utilizes two special skills of the occupational therapist: functional evaluation of the hand and splinting.

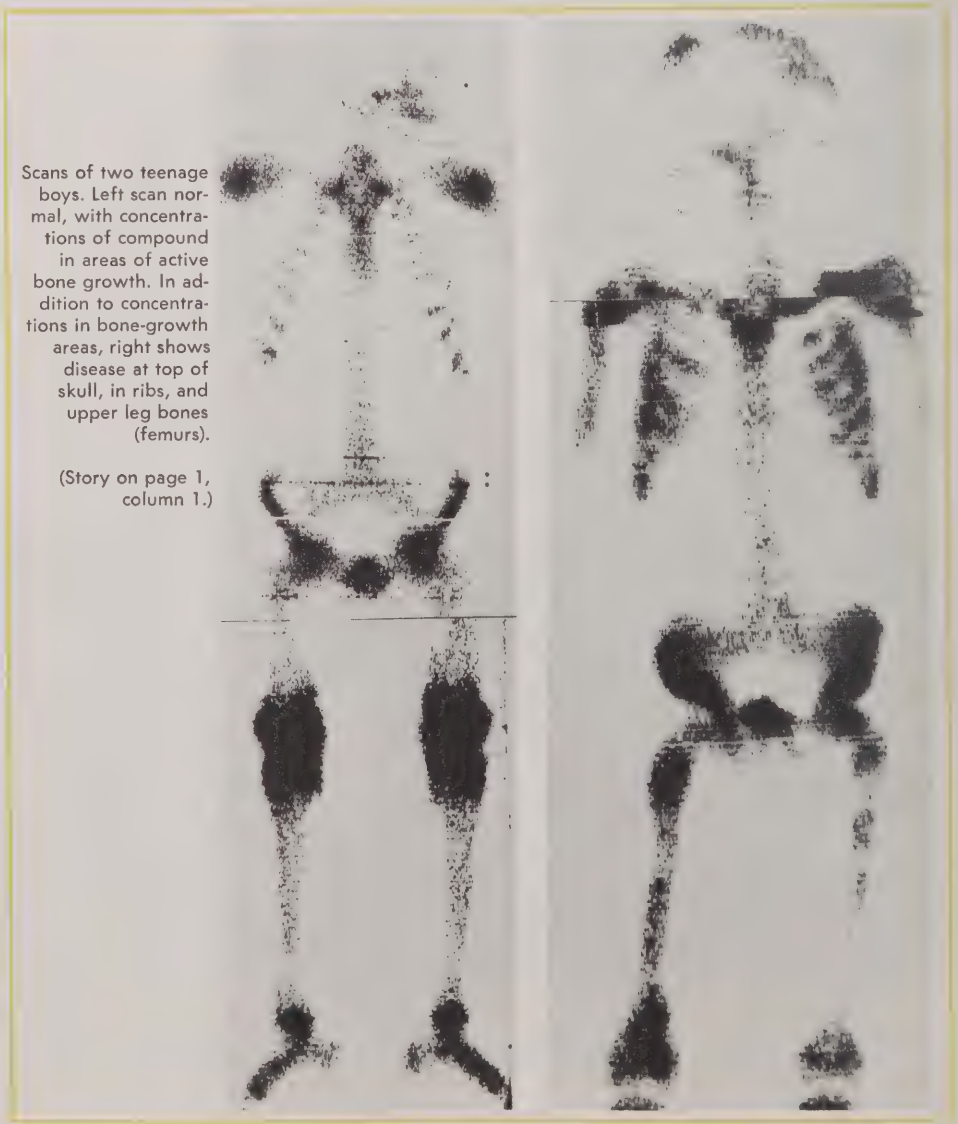
The common image of a splint is a simple stick and bandage. The hand splints designed by the therapist, however, may take up to three hours to construct. Made of thermoplastic material which softens in water, they are custom designed to meet the needs determined by the doctor.

The splint may serve to position the hand, prevent contracture, develop strength, or increase range of motion and function.

In the case of burned hands, immediate splinting is essential to help prevent deformity. The onset of fibrosis (excessive growth of connective tissue) and rapid contraction of ligaments can fix the hand in a permanent claw-like position. The therapist's skill thus makes her a vital part of the emergency team.

The roles of the many specialists who seek to return the patient to a productive life are interlocked. The occupational therapist works closely with physicians, nurses, and social workers as well as with physical, speech, and recreational therapists.

"To accept therapy," Mrs. Fishwick said, "the permanently disabled patient has to accept the fact that he has limitations and must learn to live with them." Routes that bypass those limitations are the special province of the rehabilitation worker.



Scans of two teenage boys. Left scan normal, with concentrations of compound in areas of active bone growth. In addition to concentrations in bone-growth areas, right shows disease at top of skull, in ribs, and upper leg bones (femurs).

(Story on page 1, column 1.)

MGH News

Vol. 33 No. 5 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS June-August, 1974

Can the Mind Learn to Control a Painful Illness?

MUMPS – Contagious, But Not a Disease

MUMPS has become popular.

To begin with, only the MGH had it. Since then several hundred hospitals, clinics, private practices, and medical schools have acquired it. And now MUMPS has even spread to some business firms.

MUMPS, or MGH Utility Multi-Programming System, is a computer programming language. Developed at the MGH in the late 1960s, it is helping its medical users apply computer technology to the mechanics of delivering health care. Most users are in the U.S. Others are scattered throughout the world.

MUMPS was born at the MGH Laboratory of Computer Science. Overseeing the language's development was Dr. G. Octo Barnett, the laboratory's Director.

Dr. Barnett has an explanation for the popularity of MUMPS. In conjunction with the falling costs of computer equipment, he said, the language has made possible the widespread use of computers in medicine.

Of computer languages, MUMPS is the only one designed with medical users in mind. It has several hundred separate medical applications. They range from acute respiratory-care assistance, to medical education, to X-ray result reporting.

MUMPS also has more than 50 business and general uses. Its following in the business world includes a radio and television network (Canadian Broadcasting Corporation), a legal firm, and an automobile parts distributor.

Filling the needs of medicine, not business, however, was the MGH's original goal in producing the language. Before its development, the computer equipment that was needed to perform complicated medical tasks was far too difficult to program for hospital use. Dr. Barnett's laboratory set out to remedy this situation. Their solution: finding a simple, yet sophisticated, language which would work for medicine on the more inexpensive computers.

Like spoken tongues, computer languages are not created; they evolve. So it was with MUMPS. And so it happened that MUMPS has a linguistic history.

MUMPS' earliest known ancestor was JOSS. Probably developed as a

(Continued on Page 2)

Dr. Theo C. Manschreck demonstrates how the patient attempts to warm his hands. (See page 4 photo.)

MGH researchers have taught three patients to control attacks of a painful condition by employing the mind to raise their hand skin temperatures.

The process used, biofeedback, involves training the patient to control one of his "involuntary" functions such as heart rate or blood pressure. These are usually thought uncontrollable.

The work is highly experimental. Indeed it has failed in four of the seven MGH patients with the painful circulatory condition known as Raynaud's phenomenon.

Granted the very preliminary nature of their efforts, the investigators think that it may be years before the process becomes an accepted treatment for stubborn cases of Raynaud's phenomenon. But the researchers are excited about the implications of the very early results of their own work and that of other groups.

And although the study was a preliminary one, the results have convinced the experimenters to extend and expand their project.

The investigators, led by Dr. Alan M. Jacobson, an MGH psychiatrist, under the supervision of Dr. Thomas P. Hackett, Chief of the MGH Psychiatric Consultation Services, include Elizabeth L. Silverberg, M.A., an MGH psychologist, and Dr. Theo C. Manschreck, an MGH psychiatric resident. Dr. Owen S. Surman, a psychiatrist, was part of the team during the early work but is now in the U.S. Navy.

With their first study, completed in 1973, the MGH group has joined a relatively small band of scientists in this country testing biofeedback's

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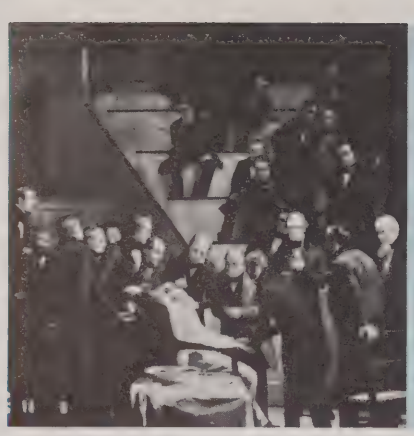

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EDITORIAL:

A Dim Promise, Not a Panacea

Biofeedback sounds like a miracle. Even physicians are amazed at the mechanisms by which a patient learns to control "unconscious, automatic" bodily functions. In fact the whole subject is so shrouded in mystery that the *News* pondered for more than a year the presentation of the article appearing on page 1. After all, research in this field is so exploratory that one can only guess at the implications. It would be cruel to raise the hope of patients that all kinds of miraculous cures lie around the biofeedback corner. To date there is no certitude that the technique will ever prove an important treatment for any disease. Indeed the scientific evidence that biofeedback works in controlling abnormal conditions is quite meager. Yet it is of such growing interest to the research community that a carefully qualified article describing some of the published work on the subject now seems in order.

What makes the procedure so fascinating are the questions it raises. The concept of biofeedback seems to be telling us that the mind really controls, or can control, "automatic" bodily functions. If so, can the brain also cause diseases? Can it cure them? Can the mind, as an instrument for treatment, be harnessed in ways other than through biofeedback? Can man learn to think himself into states like hibernation? If so, would this slow the process of aging? Such a possibility might make feasible long-distance space travel. Is biofeedback an ability which evolution decided to erase as too impractical? While consciously controlling heart rate or blood pressure might be beneficial to a sick man, the process would provide little time for anything else were we all required to think continuously about what now comes naturally. If some of these questions turn out to have positive answers, medicine may be standing on the threshold of an exciting new era – but one unlikely to change treatment for a long time.

These are but a few of the science-fiction thoughts that the new research provokes. Daydreams of this nature are perfectly harmless and may even stimulate new avenues of productive research. The only danger lurks in the false hope that the current experimentation might raise in patients seeking cures for incurable diseases. Unscrupulous quacks thrive on such illusions. Their patients die of them. At present biofeedback is a dim promise, not a panacea.

Contagious Language Helps Medicine Cut Computer Costs

(Continued from Page 1)

hobby, this language was the 1964 product of a Rand Corporation scientist. JOSS evolved into two separate languages. These were TELCOMP and FILECOMP, developed by Bolt, Beranek & Newman, Inc., a Cambridge computer research firm, and by General Electric. MUMPS was based on many of the concepts of these two languages but differed in being implementable on a relatively small machine.

Beginning in 1966, two employees of the Laboratory of Computer Science, Curt Marble and Neil Pappalardo, aided by other workers in the laboratory, spent three years developing and refining MUMPS. They did so under grants from the National Institutes of Health and the Bureau of Health Services Research. The MGH first put MUMPS to work in 1967.

Dr. Barnett praised the efforts of MUMPS' developers: "It clearly takes a certain kind of genius to develop a computer language."

Mr. Pappalardo and Mr. Marble left the MGH in 1969 to help form one of the many commercial firms now marketing the language the two designed.

In the intervening years, the Laboratory of Computer Science has been at work further developing and refining the language and finding applications for it at the MGH. To date there are about 20 such uses. Among them, for instance, are computerized test-result reporting from the Chemistry and Bacteriology Laboratories and a computerized X-ray scheduling system.

In the neighboring Shriners Burns Institute, the MGH Laboratory of Computer Science has developed a computerized record system for keeping track of the life functions of patients in intensive-care units.

MUMPS was an important ingredient in another computer project of MGH design: the automated medical-records system for the 35,000 prepaid subscribers of the Harvard Community Health Plan. At any of numerous computer terminals, one of the plan's doctors can call up a patient's record in seconds.

In each of these applications, MUMPS has proved useful because it

fits in with the way health-care institutions handle information. This handling involves a continual adding to and review of a central file.

Hospitals experience such activity day and night. The patient's name and personal data are at the core of a central file. Some information – test results, life signs, or the outcome of a patient-doctor interview – constantly changes. Often data is fed to the central file from several different points within the hospital.

Because a similar flow takes place in some commercial operations, businesses also find applications for MUMPS. In a warehouse, for instance, supplies may come and go from several geographically separate sites. Each can report the traffic in a particular item to the computer. It can then provide an instant picture of the warehouse's inventory.

"We call this kind of use 'time-sharing remote access,' " Dr. Barnett said. "MUMPS was designed for an environment in which there is a central computer with many users, all working on the same data base."

Two features of MUMPS, the Harvard Medical School Associate Professor of Medicine said, make it relatively inexpensive to implement. One is that it can perform fairly sophisticated tasks on simple equipment.

In addition, it is well suited to the so-called "modular approach" to building computer systems. This strategy is one of developing a system in steps rather than acquiring all the equipment at once.

"You can start small," Dr. Barnett said, "and build and expand as you identify applications which are cost justifiable."

Another advantage of the new language and part of the reason for its adaptability to the modular approach, he asserted, is ease of programming – giving the computer a set of operating instructions in MUMPS.

"It is an interpretive language," said Dr. Barnett. "One can program and execute it – put it to work – at the same time."

Many languages require delays of several days between programming and execution. Thus even a minor change in the procedure employed to request a patient's medical record might take days to put into effect.

Dr. Barnett described MUMPS as being more "powerful" than most computer languages, while maintaining simplicity and a similarity to English.

Surrounded by the computers of the MGH Laboratory of Computer Science, Dr. G. Octo Barnett examines a program.

"A computer language is somewhat like mathematics," he said. "You can add new features which enable you to do more powerful operations. Before you knew about multiplication, you could multiply by successive addition. Then you began to use a little sign which represents multiplication. You've made the language richer by giving it another operator – a kind of shorthand notation to express a more powerful function.

"Imagine you want to ask the computer, 'Is the patient's name John Smith?' One way to do this might be to ask if the first character is 'J,' the second 'o,' and so on. In a more powerful language, you can ask, 'Is name equal John Smith?' "

Dr. Barnett believes that MUMPS is helping to speed up what is necessarily, because of cost and other problems, a slow process: the introduction of computers to medicine. By cutting costs and adding efficiency and power, he believes, MUMPS has helped move medicine toward "tremendous horizons which are opening up in the use of computers."

(Related Story on Page 7)

Currently leading the ever continuing development of the computer language MUMPS are Robert L. Rees (left) and Jack E. Bowie, both of the MGH Laboratory of Computer Science.

With Control, He Could Swim Again

(Continued from Page 1)

treatment value. The technique, also known as operant conditioning, or visceral learning, has shown early promise in the relief of a variety of ailments.

All these illnesses, because of biofeedback's nature, have involved "automatic" bodily functions linked to the "autonomic nervous system." These functions – such as heart rate and skin temperature – are those that the individual cannot control at will.

Research has revealed that if you give a person continuous and simultaneous information (feedback) on how such a function is being performed, he can apparently learn to control it. The mechanism by which the individual does this is unknown.

The feedback, triggered by a measuring device, usually takes the form of some kind of audio signal or visual display. Investigators might, for example, employ a light bulb. As the function monitored varies, so does the intensity of light from the bulb. Researchers have also used tones, which vary in pitch, or simply a polygraph needle moving up and down on a chart.

With operant conditioning, Dr. Hackett said, patients could theoretically learn to control any system of the body which technology can measure. Whether they can do this in practice remains to be seen.

In using the technique, medical researchers are reaching for the ultimate goal of giving the patient some degree of control even without measuring or feedback devices.

This was the aim of the MGH investigators in experiments with patients having Raynaud's phenomenon. The ailment is characterized by the episodic collapse of the small arteries of the hands and feet. The collapse reduces blood flow causing a sensation of excruciatingly painful cold in the affected members.

The researchers had good reason for attempting to treat this illness. They knew that conventional treatment is usually not effective. Doctors sometimes find an underlying disease bringing about the condition and treat it, but in most cases the cause of the phenomenon is unknown.

Instead, the MGH group tried to teach each patient to increase the blood flow to his hands. Because they had no easy way of measuring blood flow, however, the researchers chose to use biofeedback from a closely linked function: hand skin temperature. When blood flow near the surface increases, it warms the skin of the area.

The experiences of others and the nature of the technique gave the MGH investigators little reason to believe it would cause any adverse side effects. Their patients contributed to this belief, reporting none.

Dr. Manschreck is joined by his fellow biofeedback researchers, Dr. Thomas P. Hackett, Dr. Alan M. Jacobson, and Miss Elizabeth L. Silverberg. The light box on the table tells Dr. Manschreck whether his hand skin temperature, as picked up by thermistors attached to his forefingers and monitored by device at right, is rising or falling.

The first Raynaud's phenomenon patient was a 31-year-old Boston researcher. He had suffered from the ailment for three years. As with most persons having this illness, cold weather, smoking, proximity to cigarette smoke, and anxious moments could bring on attacks.

The patient's physician had tried conventional treatment methods at first. Involving medication, these turned out to cause the patient unpleasant side effects. The investigators taught him self-hypnosis, a relaxation technique. For three 45-minute sessions, he relied only on this method, fantasizing about lying on a beach with the sun's rays beating on his hands.

Results thus produced did not impress the experimenters. The patient managed to raise the temperature in his hands only slightly more than one degree Fahrenheit.

Finally, biofeedback entered the picture. The researchers began by attaching thermistors, temperature-measuring devices – one to the patient's hand and one to his forehead. From these devices, wires led to an apparatus which measured the difference between the temperatures at the two points. Since the forehead temperature varied only slightly, this difference provided a fairly accurate picture of any hand temperature changes.

To the temperature-monitoring machine was attached a training device which emitted "beep" tones. If the hand skin temperature rose, the difference between hand and forehead temperatures declined, and the beeps would increase in pitch.

In each session the patient tried to control his hand temperature for about 15 minutes. The hand thermistor was switched back and forth between left and right hand so that he could attempt regulating blood flow, as indicated by temperature, in both.

The first session was disappointing. In the second, however, the patient began to exhibit control. By the fifth and last, he could raise the temperature in either hand by more than seven degrees. This meant increasing the temperature from slightly less than 81 degrees to a more normal 88.

The first patient turned out to be the MGH group's most impressive success. Seven and a half months after their experiments ended, he could still control the warmth of his hands, and without any type of machinery

helping. Thus he could "think" his hands warm to prevent the pain of his illness.

Their second patient was a scientist who was forced to avoid swimming because it brought on attacks of Raynaud's phenomenon. He took three months of weekly or semiweekly sessions to achieve control. Once he did, he went back to his usual swimming routine. To help them relax during the sessions, some patients received biofeedback in combination with self-hypnosis and other relaxation training.

"The successful patients," said Dr. Jacobson, a Harvard Medical School Instructor in Psychiatry, "reported a sense of well-being when they found they were exhibiting some control over their problem. They had a tremendous sense of relief and comfort."

Four patients, however, went through up to 40 sessions without being able to bring about effective control. The MGH investigators cannot explain why.

Beginning with the third patient, two changes in equipment occurred. The original equipment which compared hand and forehead temperatures had been borrowed. After returning it, the researchers were forced to use a device which measured the temperature of a hand alone.

The investigators also had to change to light, rather than sound, feedback.

"What this may have meant," Miss Silverberg speculated, "is that with an auditory tone, the subject could be more relaxed. He could sit back and close his eyes; something he could not do if he had to concentrate on a light source."

Most recently another patient has been successful using this new equipment combined with training in self-relaxation. She reported that before the training sessions she had never realized the full extent to which anxiety could bring on attacks. She is now able to deter such episodes entirely.

The researchers found no evidence of factors other than equipment which might have influenced the success rate.

"We found no correlation between aspects of the patient's personality and his response to treatment," said Dr. Hackett, who is also a Harvard Medical School Associate Professor of Psychiatry, "but there are variations from person to person in ability to respond to operant conditioning."

The three successes in their re-

(Concluded on Page 6)

Drs. Hackett (left) and Jacobson review polygraphy printouts showing the ups and downs of a patient's hand skin temperature during a biofeedback session.

Groundbreaking in Biofeedback

Biofeedback is a newcomer to medicine. The bulk of research into treatment uses for the technique has been conducted over the past five years, but the method is still not proven as a regular treatment.

Serious basic research in biofeedback began several years ago, largely under the direction of Neal Miller, Ph.D., of Rockefeller University, New York City. In experimental animals, he did the groundbreaking work demonstrating voluntary control of visceral functions such as blood pressure.

Some of the most successful patient studies in the area have involved migraine headaches. Researchers trained volunteers to reduce blood flow to their heads. Their headaches had resulted from an excess of this flow.

Other investigators have managed to relieve some tension headaches by employing feedback in order to show a patient by means of a measuring device known as an electromyogram how tense his forehead muscle (frontalis) was.

In similar studies, experimenters had moderate success treating patients with spasmodic torticollis, the contraction of a neck muscle which pulls the head to one side. Those treated learned to relax the muscle.

One of the most thorough biofeedback projects was an attempt to control asthma by training patients to relax their muscles generally. The results were less conclusive than work with headache patients.

Some persons with severe lack of bowel control (fecal incontinence) learned to relieve their condition by synchronizing the contraction of two "involuntary" intestinal muscles.

In treating hypertension (abnormally high blood pressure), biofeedback has also achieved some success. The technique has additionally shown promise in controlling various types of cardiac arrhythmias (irregular heartbeats).

Very preliminary research indicates some potential for teaching patients with epilepsy to alleviate their illness by producing brain waves of a certain frequency.

In some cases of apparently uncontrollable vomiting (ruminative), biofeedback has enabled the patient to prevent it. But in all these studies results are too preliminary to consider biofeedback as a standard treatment.

He Helped Mold a Vital Diagnostic Science

More than 40 years ago, an MGH surgeon chose to devote himself to a budding diagnostic science.

With perfectionist skill, he practiced, taught, and expanded it, almost single-handedly keeping it living and growing at the MGH.

That man was Dr. Edward B. Benedict. The field was endoscopy, the use of tubes and special lenses to examine the cavities of the human body.

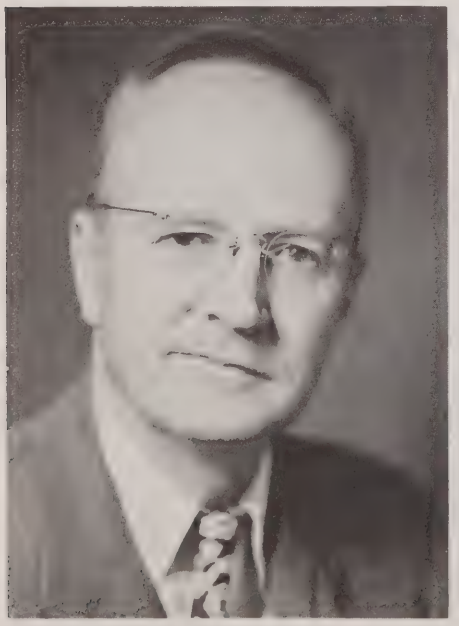
Dr. Benedict died March 28 after a long illness.

When he entered the endoscopy field in the 1930s, it was a limited technique. The only instruments available were rigid metal tubes, able to reach but a few areas of the body. There were just three types of endoscopy.

Today there are eight. They range from laryngoscopy, an examination of the throat, to colonoscopy, an inspection of the colon (large intestine). The last decade has seen a second generation of instruments – highly flexible and directable – supplementing the rigid ones still useful for some procedures.

In contrast to the general endoscopist of the past, today's MGH surgeons, each with a specialty, perform only endoscopies associated with their areas of expertise. This development made Dr. Benedict, the hospital's first general endoscopist, also the last.

A native Bostonian and 1923 Harvard Medical School graduate, Dr. Benedict interned at the MGH from 1924 to 1926. Endoscopy attracted his attention in 1932 when two German doctors revolutionized the field. Their invention: the Wolf-Schindler gastroscope, the first flexible tube for viewing the stomach.



Dr. Edward B. Benedict
(1954 Chase Ltd. photo)

On hearing of their discovery, Dr. Benedict, with Drs. Chester M. Jones and Charles I. Johnson, MGH physicians, introduced it to the MGH. They were the first physicians in the United States to use the device.

The MGH Chief of General Surgical Services at the time, the late Dr. Edward D. Churchill, persuaded Dr. Benedict to make endoscopy a career. Dr. Benedict became the hospital's expert in the field, consulted whenever such a specialist was needed.

To generations of MGH surgeons, he was a teacher of endoscopy.

"He was an excellent teacher," recalled Dr. Hermes C. Grillo, an MGH surgeon. "He had all the necessary characteristics for that kind of work: extreme patience, thoroughness, and precision, and a delightful sense of humor."

While his teaching insured a continued high quality of endoscopy at the MGH, Dr. Benedict extended the boundaries of the field with research. Dr. J. Gordon Scannell, an MGH surgeon and onetime associate of Dr. Benedict, feels that the endoscopic pioneer's greatest contributions were his descriptions of disease as seen through an endoscope.

"He was a very careful, precise, and unhurried worker," Dr. Scannell said. "His descriptions reflected this."

In 1948, Dr. Benedict contributed a new instrument to the field. His operating gastroscope allowed surgeons for the first time to easily remove tiny samples of tissue or unwanted fluid from the stomach.

This invention earned him, in 1954, the first American Gastroscopic Society Rudolf Schindler Award for advancement of the gastroscopic procedure. Dr. Schindler himself made the presentation.

Dr. Benedict, with numerous scientific articles to his credit, also authored two books. One, on endoscopy in general, published in 1951, was among the most respected textbooks of its time.

Dr. Benedict matched excellence in endoscopy with leadership in nonmedical pursuits. He served successively as Director, President, and Honorary Chairman of the New England Citizens Crime Commission. Once a member of the Board of Governors of Brookline's Longwood Cricket Club and President of Longwood Covered Courts, he was known as one of the area's best amateur tennis players.

At least at one point, Dr. Benedict's personal and professional lives converged. His wife of many years, Dr. Patricia H. Benedict, is a retired MGH physician.

Retiring in 1962 from his Harvard post as Assistant Clinical Professor of Surgery, Dr. Benedict remained on the MGH Board of Consultation until 1969. In that year he performed his final endoscopy.

In the foreword to Dr. Benedict's book on endoscopy, Dr. Churchill explained why he believed Dr. Benedict's contributions were important:

"So the answer as to how Dr. Benedict has molded endoscopy into a productive and significant area of medicine is simple: The subject matter of the area has been first and foremost the patient, and not merely the technical skill of looking at his insides."

Biofeedback: "One of Major Treatments of the Future"

(Concluded from Page 5)

search, which was partially supported by grants from the National Heart and Lung Disease Institute and the Public Health Service, have encouraged the MGH scientists. So have three similar cases reported by other investigators.

A report on the first Raynaud's patient treated at the MGH with biofeedback appeared in the August 13, 1973, edition of the *Journal of the American Medical Association.*

In addition to planning for extensive studies in Raynaud's phenomenon, the MGH group is contemplating other illnesses on which to try the method.

While cautioning that it may be years away from becoming an accepted treatment, Dr. Hackett is optimistic about the long-range future of the technique:

"I think that biofeedback may become one of the major treatments of the future for diseases that until now have been largely uncontrollable. And although this technique may change markedly from what we now know as operant conditioning, a whole new avenue of medicine has been opened."

Pictures From Sound: Bright Prospects

(Concluded from Page 8)

cysts in an ultrasound picture because of their homogeneous internal structure. These tumors, however, can be distinguished from both cysts and cancers by the way they alter the reflected sound.

Cysts, because of their smooth walls and watery interiors, do not decrease the strength or "amplitude" of the sound echoes, but solid tumors decrease it considerably. The amplitude is equivalent to the loudness of audible sound, and measurement of the change in loudness in these cases helps to characterize the precise tumor type.

Ultrasound can also help, Dr. Birnholz explained, in determining whether a tumor is invading surrounding tissue. Such an invasion produces in the ultrasound picture a fading-off effect of the tumor's edge. It would otherwise appear sharply defined.

There are some areas of the body in which ultrasound images are not possible. Any parts surrounded by bone, air, or gas are beyond the reach of imaging, since sound cannot pass readily through these substances.

Another limitation: Ultrasonography is most suitable for examining small areas in detail and therefore is not practical as a general screening method for masses that lack symptoms.

"You don't usually want to use ultrasound to decide if somebody has a mass," Dr. Birnholz said, "but knowing somebody has one, and knowing where it is, you can use ultrasound to elucidate its features. The reason for the restriction is this: It requires from 15 to 30 minutes, sometimes longer, to do an ultrasound study of a specific area. If this technique were used for routine screening, an examination would just take too long."

The equipment for ultrasonography imaging is simple, portable, and relatively inexpensive. The ultrasound pictures appear on a green oscilloscope screen usually set in a box resembling a flattened television set.

Attached is an arm-mounted crystal microphone. The crystal vibrates to produce the sound, and in turn, vibrates in response to returning sound waves. The vibrations are transformed into electrical impulses which are processed electronically into images on the screen.

Ultrasound is very sensitive to tissue density differences, and echoes will reveal density variations of as little as one percent. X rays, by comparison, cannot detect density differences less than 30 to 40 percent in magnitude.

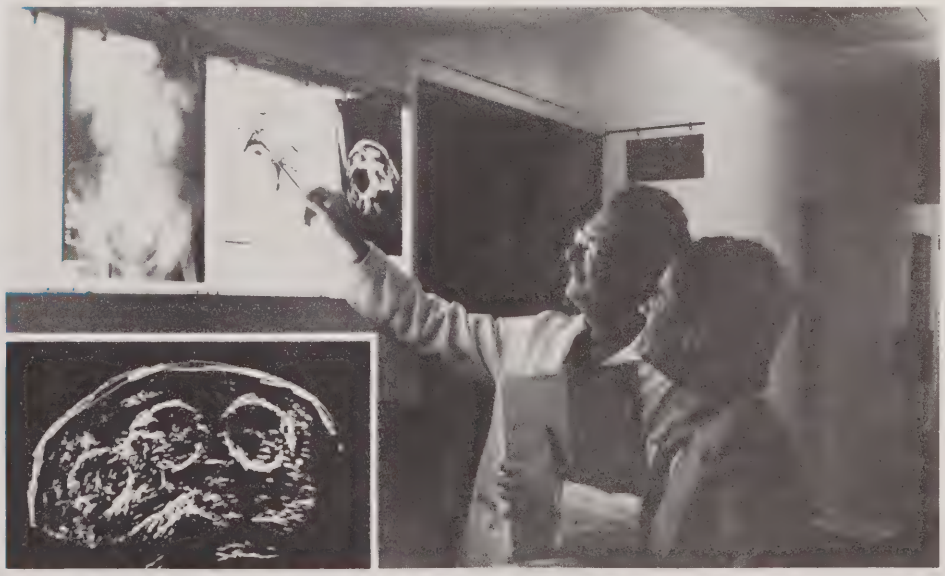
With newer experimental equipment Dr. Birnholz, a Harvard Medical School Instructor in Radiology, can measure objects as small as roughly 1/136 of an inch – one quarter the wavelength of the sound employed.

Research both at the MGH and the Massachusetts Institute of Technology (with which Dr. Birnholz is also associated) is pursuing methods of improving the accuracy and usefulness of ultrasound images.

Sound made its medical debut in 1946 when Michigan researchers began attempts to get ultrasound images of gallbladder stones. Lacking adequate technology, early investigations were disappointing. And although other uses of ultrasonography became popular in the interim, pictures made from sound did not attract much attention until the 1960s.

A number of teaching hospitals throughout the nation now employ ultrasound of one type or another. Within the past few years, ultrasound has also become available in some private institutions.

Dr. Birnholz believes the technique shows great promise. If technological advances in the field continue, he envisions a bright future for ultrasonography.



Dr. Jason C. Birnholz (left), with Dr. Stone looking on, points to ultrasound picture, comparing it with conventional X-ray results. Inset shows an ultrasonography picture of a woman pregnant with triplets. The three circles are the heads of the unborn children.

MUMPS: 8 Strains

(Related Story on Page 1)

MUMPS' success, in the view of Dr. G. Octo Barnett, has been so complete that success itself has created the only problem so far.

With the number and variety of its users growing rapidly, MUMPS, like many computer languages, has begun to sprout dialects. There are now eight. Each new specialized use has encouraged modifications.

This trend, in Dr. Barnett's eyes, threatens one of the chief assets of the language. It is common to a number of institutions, allowing them to easily share computer information and ideas.

In order to foster such exchanges and to offset the effect of dialects, Dr. Barnett, Director of the Laboratory of Computer Science, headed the effort to organize the newly formed MUMPS Users Group (M.U.G.). The group now has over 700 members.

"Hopefully," Dr. Barnett said, "this incipient Tower of Babel will be resolved by a standardization effort sponsored by the Bureau of Health Services Research and the National Bureau of Standards."

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                                  BLOOD SUGAR= 143
                                  BLOOD SUGAR= 157
                                  BLOOD SUGAR= 164 HIGH
                                  BLOOD SUGAR= 79 LOW
                                  BLOOD SUGAR= 80
```

A set of instructions in MUMPS (left) is followed by the results (right). In words and symbols the program tells the computer to ask for the patient's blood sugar level. If the user types a number above 160, the computer is instructed to type "high." For a number lower than 80, the computer responds "low." Underlined numbers are what the user typed.

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Using Silent Sound to Penetrate Tumors

(Third in a Series on Radiology)

Sounds with frequencies hundreds of times higher than the highest the human ear can detect are helping MGH physicians examine patients and diagnose certain illnesses.

Known as ultrasound, these ultra-high-pitched tones are the major ingredients of a technique called ultrasonography. This diagnostic tool is based on the principles of sonar, used by wartime navies to hunt one another's submarines.

Doctors employ ultrasound varying in frequency from 2 to 10 million cycles per second. Above 20,000 cycles per second, the human ear registers nothing.

To make use of this sound, physicians simply project it into the patient. Depending on their purpose, they measure its echo in a variety of ways. They can also transform the echoes into an image of a body area on an oscilloscope or television screen for visual analysis.

Ultrasonography has two main attractions. It is a reliable tool, often showing details which cannot be seen by conventional X ray. More importantly, it is what doctors call a "noninvasive" form of examination. Involving no surgery, injections, or radiation, it is believed to carry far less than even the minimal risk of other diagnostic procedures.

"The biological hazard of putting very low intensity sound into tissue," said Dr. Jason C. Birnholz, an MGH radiologist working with ultrasonography, "has not been clearly defined, but it would seem more a theoretical consideration than a real problem. Some people have gone so far as to say there is no hazard, which is an exaggeration. But it seems likely that any risk that might exist will prove miniscule."

At the MGH, Dr. Birnholz has helped develop the use of ultrasound to distinguish the kind of mass (tumor or cyst) a patient has. He has also used ultrasound to diagnose problems occurring during pregnancy.

The MGH cardiologists of the Noninvasive Laboratory have been employing ultrasonography in the heart. Their work will be presented in a future issue of the MGH News.

Dr. Birnholz, in distinguishing masses with ultrasonography, has been producing ultrasound pictures. Much of what these images can reveal about the kind of tumor a patient has cannot be seen with conventional X rays. For example, such pictures distinguish a simple cyst from the serious problem of a cancer. The need for this distinction is a very common situation in the diagnosis of kidney masses.

X rays show the outside walls of a mass. Since the outside walls of many cysts and various types of tumors appear the same, telling the masses apart by X ray is very difficult.

Unlike X rays, ultrasound images show the interior structure of organs or masses. In general, high-frequency sound waves are reflected from "interfaces," which are regions where different tissues abut. These reflections form the ultrasound picture on the oscilloscope screen.

A cyst has smooth walls and is filled with watery fluid. There are no internal interfaces, and sound images show only the walls where the fluid and cyst margin meet. Neoplastic tumors (new, abnormal growths), on the other hand, are solid and usually contain irregular dead-cell areas. These pockets cause internal echoes, which are seen in the sound pictures.

Some malignant tumors (sarcomas and lymphomas) may look much like

(Concluded on Page 7)

Candace S. Rowe, RN, assists as Dr. Lawrence B. Stone, Resident in Radiology, uses ultrasound to examine an injured boy's kidney.

MGH News

Vol. 33 No. 6 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS September, 1974

Study Begins on Device to Detect Abdominal Ills

Acquiring New Angles on Brain Disease

(Fourth in a Series on Radiology)

Dizzy, sleepy, and with the vision in his right eye a blur, 22-year-old Robert Casaubon arrived at the MGH one summer afternoon in 1973. From a broken vessel inside his skull, blood was seeping out and putting pressure on the rear of his brain.

Only 19 days before, the hospital had acquired the machine which probably saved this Lowell construction worker's sight. On August 2, 1973, the MGH had become the second institution in North America to install a revolutionary new X-ray device for the brain: the computed tomography (C.T.) scanner (also known as the EMI scanner).

The story of Mr. Casaubon's introduction to this machine began soon after he reached work on the morning of August 21, 1973. He developed a sudden headache and feeling of dizziness. Rushed to a local hospital, he was transferred from there to the MGH.

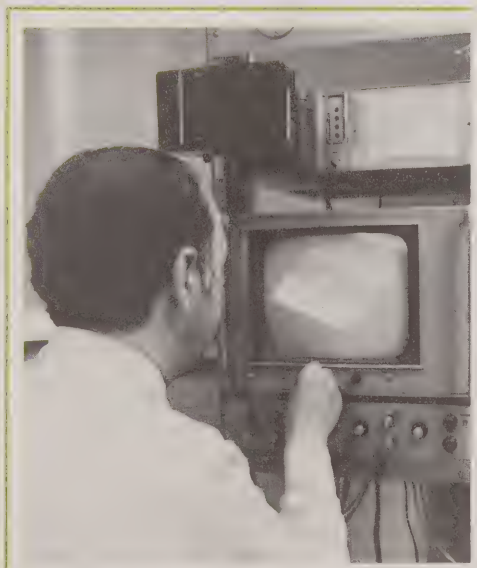
On his arrival, MGH physicians suspected he had a brain hemorrhage. They arranged for a cerebral angiographic examination, the usual one for a patient in his condition, which involves the injection of a special contrast medium into an artery to enhance X rays of the brain.

The test showed a large mass within the back portion of the head. The angiogram did not reveal that the mass was composed of blood. Nor did it indicate that at the rear of his brain the Lowell man had a small arteriovenous malformation, a tangle of thin-walled blood vessels. Later surgeons discovered that one had burst.

The examination also failed to show the exact location or borders of the bleeding. Without this information, an operation to relieve the pressure from the spilled blood and to repair the broken vessel might have damaged the young man's brain. Because the bleeding had occurred near his vision center, surgery might have endangered his sight. Yet the operation was necessary to save his life.

MGH physicians turned to the newly acquired scanner for help. After a 30-minute scan, the machine revealed all the needed details. Neurosurgeons decided to operate.

(Continued on Page 4)



A computer-created image on an oscilloscope screen simulates the accuracy of an actual scan and helps determine the best design for an abdominal scanner.

The National Cancer Institute has awarded the MGH some $380,000 over three years to develop a device to detect abdominal disease with unheard of speed and accuracy. The machine would be based on the same principles that the EMI brain scanner follows.

David A. Chesler, Sc.D., is working on the new scanner with Saul Aronow, Ph.D., of the Division of Radiological Sciences and Technology, and Gerald M. Polucci, M.S., a Physics Research Laboratory colleague.

In a separate but related project, Dr. Jack Wittenberg, a radiologist, will plan for the actual use of the device. By gathering information on how the abdomen would look in scanner pictures, he will develop guidelines for interpreting examination results.

Like the brain scanner, the envisioned device would utilize computer analysis of X-ray views of its target taken at different angles. But of necessity, the new device would have to complete an examination of the body quickly. A single slice from hundreds of angles may take the abdominal scanner ten seconds. On the brain scanner the same task requires five minutes.

Without speed, Dr. Chesler said, it would be difficult to apply the scanner principle to the abdomen. The movement caused by breathing would produce a blurring effect in the picture. The new scanner would allow the patient to hold his breath during an entire set of hundreds of readings. Thus the distortions which might be produced by breathing motion would be avoided.

At this early stage the researchers

(Concluded on Page 3)

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EDITORIALS:

A Remarkable Device

When applied to a medical innovation, the word "revolutionary" is guaranteed to make any self-respecting scientist shudder.

So when physicians agree that the word might be appropriate for a new brain X-ray device called "computed tomography scanner," it must be remarkable. The rave comments about the scanner come one year after its introduction to the MGH (page 1 article). Enough time has elapsed to evaluate the device reasonably well. While it has proven ineffective for diagnosing some disease processes, it has exhibited marked superiority to other forms of X rays in probing most brain abnormalities.

Now an MGH team is trying to apply the principle of the brain scanner to the abdomen. To devise a really effective machine will require the leaping of hurdles described in another page 1 article. Success is not guaranteed and, if it comes, is certainly not a few months down the pike. Should the project reach fruition, however, the radiologist might get a new perspective on a whole panoply of diseases, and the word "revolutionary" might once more prove appropriate.

An Endorsement for Basic Research

In the 1960s some might have wondered why the MGH Laboratory of Computer Science was trying to develop a computer language. New medical uses for computers might have seemed a more appropriate activity for a hospital-based research unit. But the experts involved devoted time to the language as well as to practical applications of existing knowledge.

The general result is MUMPS, the computer language described in the June-August *MGH News*. Of particular interest is the fact that MUMPS has already acquired several hundred separate medical applications. Had the laboratory team members worked only on specific uses for existing technology, the chances are that they would have achieved only a small percentage of this number. Their success story is still another example of the importance of basic research.

Letters to the Editor

Dear Editor:

The *MGH News* (May 1974) reached me this a.m. I read with interest and amusement the editorial on the spelling of orthopaedics! Some years ago (during the war) at a dinner of the Robert Jones Dining Club we had, contrary to the rules, a guest – the late Sir Gordon Gordon-Taylor, then one of our greatest surgical figures – a classicist and sometime president of the Horatian Society of London. In his little speech as guest he said that "paes" also meant a fellow; so that orthopaedic surgeons could be, by him at least, regarded as "straight fellows"!

I hope we continue to deserve this description.

Sir Harry Platt, Bt.
Manchester, England

Dear Editor:

I enjoyed your editorial "What's in an 'A'?"

I am writing to support Henry Mankin's position. I, too, am a purist, and it is interesting to note that, Merriam-Webster notwithstanding, orthopaedics is the preferred spelling by the American Board of Orthopaedic Surgery, the American Academy of Orthopaedic Surgery, and the American Orthopaedic Association. Incidentally the American Orthopaedic Association is the oldest orthopaedic association in the world, and this lends a bit of authenticity to the spelling.

As a founding member of the Pediatric Orthopaedic Society, we had an interesting evening over cocktails discussing the spelling to be used in the name of this society, with an argument running much as you related in your editorial, but added to this was the question of the proper spelling of pediatrics. If we were to spell orthopaedics, which was taken from the Greek root, "paede," then why shouldn't pediatrics be spelled the same way? Conversely if we spell pediatric without an "a," why should we spell orthopaedics with an "a"? One of our Canadian colleagues pointed out that the British still spell pediatrics "ae." You may see how successful our deliberations were because we ultimately decided to call this group the Pediatric (without an "a") Orthopaedic (with an "a") Society.

Burr H. Curtis, M.D.
Medical and Executive Director
Newington Children's Hospital
Newington, Conn.

(Concluded on Page 3)

Abdominal Device: Now a Bundle of Theories

(Concluded from Page 1)

can only make educated guesses at what the new device would look like or what diseases it would help detect.

In an effort to make better projections about its potential uses, Dr. Wittenberg has been working with the brain scanner at the MGH. From that experience he has already developed a number of ideas.

Its major task, he envisions, would be helping physicians find tumors in several abdominal organs, especially cancer that has spread to these organs. It often spreads (metastasizes) to the liver.

The abdominal scanner, Dr. Wittenberg said, should theoretically be able to find tumors one-half to one-third as small as the tiniest detectable by radioisotope scan or ultrasonography.

Dr. Wittenberg is also working on a method of using the planned device in jaundice, where conventional methods in some cases fail.

An abdominal scanner could also aid radiation therapists in planning how to treat tumor patients. These therapists need the most detailed picture possible of the anatomy of the area to be irradiated.

Dr. Wittenberg's immediate interest is the lower abdomen. In the long run, however, a successful new device might target on the lungs and heart as well.

Developing the potential of the new scanner might take as long as the creation of the new machine. Dr. Wittenberg believes that scan results would be difficult to read and interpret.

In addition, abdominal scans would collect much more information than brain scans because the abdomen is so much larger than the head. Physicians would have to carefully sift through this data. Unlike the head, the abdomen lacks symmetry, a balance of almost identical structures. The imbalance would make abdominal scans even more difficult to read.

"Another potential problem," Dr. Wittenberg said, "is that the organs in which we are interested do not have a fixed location within the abdomen, as do various features within the head.

"What I'm developing is a road map – one which will tell us, for instance, what characteristics the liver will have in a scan picture. Then, when we do a scan and see something with these characteristics, we can identify it as the liver."

Just as Dr. Wittenberg has worked out theories for the scanner's potential uses, Dr. Chesler and his colleagues have created preliminary designs for the machine itself. Dr. Juan M. Taveras, Chief of the MGH Department of Radiology, and other MGH radiologists have acted as consultants. Two employees of the Physics Research Laboratory, Linda A. Deveau and Joan E. Correll, have been working with Dr. Chesler to design the new scanner's computer system. Gordon L. Brownell, Ph.D., head of the laboratory, has guided the project.

In many ways, the device would resemble the brain scanner but would incorporate means of obtaining the necessary speedy examinations.

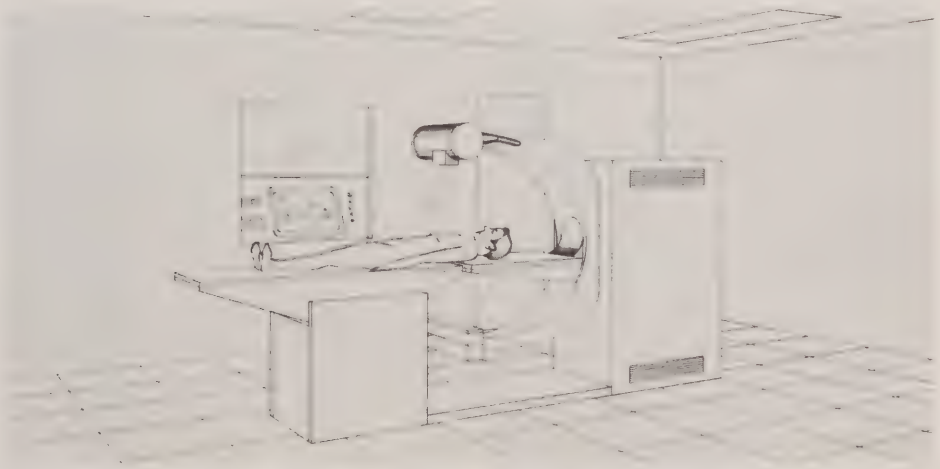
Despite the increased speed, body motion may still pose difficulties. Though the taking of an X-ray slice, obtained from hundreds of angles, is being designed to consume only 10 seconds, the patient would probably have to hold his breath for 12 to 15 seconds. This precaution would insure that the patient does not resume breathing too soon.

Holding one's breath for that long requires some effort even for a healthy person. For someone sick or elderly, the task could be even more difficult.

Breathing motion is not the only movement in the abdomen. Even if the patient can manage to hold his breath, he cannot stop peristaltic motion, the wavelike contractions and widening of the intestines. Drs. Wittenberg and Chesler do not know whether this movement will affect the scan. Both are confident, however, that they could neutralize such a problem.

They are not alone in their efforts to develop an abdominal scanner. Rather than devising a faster machine, scientists at Georgetown University Medical School in Washington, D.C., have designed a device similar to the brain scanner itself. With this approach they simply live with the problem of breathing motion. At EMI Limited, a British electronics firm, the researchers who developed the original scanner are reported to be working on a new device for use outside the head.

Today at the MGH the abdominal scanner is still only an artist's conception, a bundle of theories, computer simulations, and an assortment of special parts being carefully tested. As its developers are quick to admit, the obstacles are many. But Drs. Wittenberg and Chesler believe that the hurdles are not insurmountable and that their machine will one day be providing superior diagnosis of abdominal disease.



An artist's conception shows how the abdominal scanner may appear when it is built. The drawing is based on early designs, and the device's final appearance could be far different.

(Concluded from Page 2)

Dear Editor:

I enjoyed your sly comments on Dr. Mankin's neo-Hellenistic spelling of orthopaedics.

I much favor our British colleagues' habit of retaining the diphthongs of Greek (and of Latinized Greek). Thus oestrogen, oesophagus, anaesthetic, caecum, paediatrics, haemoglobin make for uniform use of proper pronunciation, such as: eestrogen (not esstrogen).

In my premedical courses were seven years of Latin and five of Greek, none of which I regretted. Let nonmedical editors deal with esthetic as a variant but join John Bull in his retention of the diphthong for medical writing.

Robert J. Kinney, M.D.
Albuquerque, New Mexico

New Look at Brain: "Revolutionary Advance"

(Continued from Page 1)

Within weeks Mr. Casaubon had recovered enough to return to work. Vision problems, which persisted for a time, later vanished.

In the year since Mr. Casaubon left the MGH, in hundreds of cases like his, the C.T. scanner has provided surgeons with maps for operations. On dozens of occasions, since many patients can undergo a scan without occupying a hospital bed, the device has made hospitalization unnecessary. This has saved the patient and the MGH time and expense.

The scanner has often provided quick, complete diagnoses for illnesses which once required a battery of costly, time-consuming tests.

In roughly 2,500 scans at the MGH, the $350,000 machine has proved its worth. It is safer and faster than any other technique for examining the brain's soft tissues. The C.T. scan has also turned out to be the most accurate method for diagnosing the bulk of tumors and hemorrhages in the brain.

"On acquiring the scanner," said Dr. Paul F. J. New, MGH Chief of Neuroradiology, "we had a high degree of optimism. We have now defined fairly precisely the strengths and limitations of the technique. We encountered few real surprises, and in general, the machine has exceeded our expectations."

In one area, the scanner did turn out to be far more useful than anticipated. When the machine was first produced, experts had predicted that it would not be able to detect a brain hemorrhage until some time after it had begun. This prediction was based on the assumption that circulating blood, being of low density, would be difficult to detect until it had clotted.

Unclotted blood, however, has proved to be much denser than predicted. Physicians using the scanner now know that brain hemorrhage can be demonstrated immediately after its start.

At the MGH a year's experience with the scanner has taught physicians a great deal. When the device first arrived, it was so new and revolutionary that few guidelines for its use had been established.

The MGH doctors now have a clear idea where the machine fits in among the other types of examinations of the head. The physicians have determined that the scanner is useful in preliminary examinations of patients suspected of having a wide variety of brain ailments.

After a scan, the location and general nature of a patient's problem are usually revealed. If any details remain hidden, or should the scan turn up nothing, the patient can proceed to one of the other methods for examining the brain.

"Fortunately, with many patients," Dr. New said, "the scan is the last radiological examination needed before treatment is undertaken."

As a screening device for the brain, it appears that the scanner will take a place alongside ordinary X rays.

"It turns out," Dr. New said, "that conventional skull examination is rather precisely complementary to computed tomography [that involved in the brain scan]. Good plain film examination is tremendously revealing of bone detail, an area in which C.T. scanning has a very poor resolution. Regarding soft tissues in the brain, on the other hand, plain film examination offers virtually nothing in direct information, while the scanner offers a wealth of information."

Prior to the advent of the scanner, three major techniques existed for brain examinations. All are still used, but the appearance of the scanner has altered their patterns of use significantly.

In one method, the doctor injects a contrast medium into the patient's bloodstream, as was done for Mr. Casaubon, and follows its path with a rapid series of X rays. This test, known as angiography, usually clearly portrays small details involving blood vessels. But angiography requires hospitalization and tends to be uncomfortable for the patient. This examination also carries a very slight risk.

Another technique, known as pneumography, involves the injection of air into the fluid cavities of the brain. Air injection, Dr. New said, "is time-consuming, uncomfortable for the patient, and carries a distinct, though low, hazard."

A third procedure is the injection of radioactive isotopes into the blood. The distribution of an isotope within the body is determined by detecting its radioactive emissions with special imaging instruments. Though this technique can give valuable information about the brain, Dr. New said that it often fails to show much of the detail of disease and displays almost no details of normal or disturbed brain anatomy.

At the control of the brain scanner, Nadim Sawaya, a special X-ray technician, looks through window at Miss Janet A. LaFleur, an X-ray technician, modeling as an EMI-scanner patient. The scanner revolves about the patient's head without causing any discomfort.

In most cases studied, the C.T. scanner has proven superior to all three methods for use in the brain. The other forms of examination, however, are still frequently needed for additional diagnostic information, particularly in patients likely to require surgery.

Subdural hematomas, collections of blood which form over surfaces of the brain, are frequently not detected with the scanner. These sacs often contain altered blood and fluids, which in a sense, "dilute" the scanner image.

Aneurysms, areas of distended blood vessel wall, often measuring only a few millimeters in diameter, are usually too small for the machine to pinpoint. "The detection of the intracranial aneurysm," Dr. New said, "remains almost exclusively in the province of angiography."

Like aneurysms, brain tumors called pituitary adenomas are also usually too small for the scanner to find. Although these growths are sometimes large enough for the device to locate, they occur at the base of the brain. The anatomy of this region tends to obscure the scan results.

That so few brain ailments escape scanner detection is due, for the most part, to the device's extreme sensitivity to variations in soft-tissue density. It outstrips all other radiological techniques in this regard.

In conventional methods, the brain's soft tissues, blood, and water collections tend to merge in similar or identical grays. This occurs because these substances soak up only minutely different amounts of radiation. The scanner can sort out the tiny variations and display them graphically.

The scanner achieves its superior sensitivity through a combination of some simple principles and a complex technology. One of these principles is tomography. Rather than X-raying the entire head at once, as with ordinary X-ray methods, the scanner examines only two roughly one-centimeter-thick "slices" of the brain at a time. It also probes each slice from 180 different angles, passing X rays through each spot in the slice 180 times.

The new device, unlike ordinary X rays, does not record the impressions of these rays on photographic film. Rather the scanner picks up the radiation with very sensitive detectors. Information recorded by these photon detectors is then fed into a computer, which analyzes it.

During a single scan of each of the two slices, the device actually takes 28,800 individual readings. That process requires four and a half minutes. The computer can then analyze these readings in a short time. Until this summer, analysis of two slices took the machine eight minutes. An improvement in the computer program, made available to all scanner users by the manufacturer, has speeded up the process.

William T. Gosselin, Assistant Chief X-ray Technician, takes a Polaroid photograph of the brain-scan image produced on a screen. The combination of the computer at his right and a Polaroid camera provides, in a short time, detailed information about many brain abnormalities. Left lower inset is a scan showing a benign lesion that develops from the basal region of the brain.

With the data it has analyzed, the scanner produces two different kinds of pictures of each slice of the brain. One picture is a printed sheet with about 6,400 numbered points. Each number represents the X-ray absorption properties of a particular spot in the brain.

The scanner's own electronic brain also composes a picture on a cathode ray tube like that found in a television set. The image on the tube comprises about 25,600 tiny squares of black, white, and shades of gray.

During the machine's first year of operation at the MGH, these pictures contained only 6,400 points. The same program change which speeded up the analysis also increased the detail of the scan results.

The scanner's principles and technology are the results of a 10-year struggle which began at Tufts University in Medford, Mass. It took researchers that long to design and improve the device. The final breakthrough came from a research team at EMI Limited, a British firm which produces electronic equipment and related products.

EMI is now the only company producing scanners, but two other firms, one German and the other French-based, are expected to begin production soon. As of midsummer, there were 9 scanners in Europe and 20 in North America.

Despite the speed with which the device can process huge amounts of information, demands on its use have strained its MGH schedule. The machine now scans about 15 patients a day. Beginning about 7 a.m., the scanner examines patients until about 9 p.m.

Among MGH radiologists the scanner has attracted a great deal of attention. Dr. Juan M. Taveras, Chief of Radiology, has taken a special interest in the device and is one of its prime sponsors.

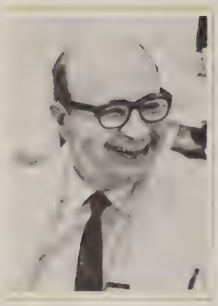
Because of the machine's heavy load, Dr. New believes the MGH needs a second scanner. The present device, he said, is operating at peak capacity, while demand for its services continues to grow.

Dr. New feels that governmental regulatory agencies are failing to realize the full need for scanners.

"There is a great tendency for them to think in terms of three or four scanners for a huge community," he said.

(Concluded on Page 8)

He Came for the Summer


Dr. Castleman

In 1930 a young Yale Medical School student made a minor decision that determined his entire career.

Wanting to spend the summer between his third and fourth years at home in Dorchester, Benjamin Castleman worked as a clinical clerk in the laboratories of the MGH Department of Pathology.

Dr. Tracy B. Mallory, then chief of the department, was eager to recruit top-flight students to his specialty. He devoted much time and attention to the young Harvard College graduate, encouraging his growing attraction to the field of pathology.

That summer marked the beginning of a long and fruitful association between Dr. Castleman and the MGH. After graduating from Yale in 1931, he returned to this hospital to continue his training. He later joined the MGH staff, on which he has served for 40 years.

On June 30, 1974, Dr. Benjamin Castleman, the hospital's senior statesman, respected medical educator, and former Acting General Director, retired from his post as Chief of the Department of Pathology where he had worked as a student. He occupied this position for 24 years. During his tenure he worked with tireless efficiency to add to the number and quality of the services the department offers the hospital.

As a pathologist, Dr. Castleman achieved international recognition. He served as visiting professor of pathology at universities in Sweden, India, Brazil and New Zealand. Lecture tours have taken him to Australia, Colombia, Cuba, Guatemala, Israel, Japan, Mexico, and Thailand.

Throughout the medical world he is well known as the editor of "The Case Records of the Massachusetts General Hospital," a weekly feature in the prestigious *New England Journal of Medicine*. The Case Records are the edited proceedings of special weekly discussions of cases culled from difficult diagnostic problems – problems that are resolved in the Department of Pathology. These sessions, known as Clinicopathological Conferences, or CPCs, are an MGH tradition of half a century.

At these exercises the physicians analyze the patient's symptoms and signs and present a differential diagnosis, one which systematically determines which of two or more diseases a patient is suffering from. When the various aspects of the illness have been discussed, the pathologists present the surgical or autopsy findings and attempt to correlate them with the clinical findings.

"These cases, the selection and preparation of which require an enormous expenditure of time and effort," said Dr. Robert E. Scully, a fellow MGH pathologist, "have risen to a high level of excellence during Dr. Castleman's tenure."

While Acting Chief of Pathology for two-and-a-half years during World War II, Dr. Castleman instituted a special CPC program for medical units of the armed forces. Lantern slides of material such as X-ray films, ECGs, and specimens presented at the conferences were mailed to the units, which could then hold their own CPC discussions. This project later evolved into a subscription service for over 200 hospitals, medical schools, and other institutions all over the world, thus allowing medical groups to conduct their own teaching exercises.

In the early 1960s Dr. Castleman began editing volumes containing selected CPC cases; there are now five such volumes comprising medical, surgical, bone and joint, neurological, and cardiac cases.

Throughout his career Dr. Castleman has emphasized the care of the patient over all other considerations. With characteristic doggedness, he has sought ways of improving that care.

"At the daily autopsy conference," said Dr. Austin L. Vickery, an MGH pathologist, "his approach has been: 'Why was the diagnosis missed? Could the patient have been treated more effectively? Did the treatment in any way harm the patient?' At the daily surgical-pathology conferences his tack was: 'How should the patient be treated?' "

Dr. Castleman is bothered by an apparent trend in pathology: the tendency on the part of pathologists to cut back on the number of autopsies they perform.

"Their attitude," he said, "is, 'Well, we've done autopsies for many years, and we've learned everything we can from them.' But today the postmortem examination is still very important. For example, physicians are using numerous new medications and procedures, and the autopsy can provide information about the action of these drugs and the effectiveness of the new methods of treatment."

As an administrator, the recently retired Chief of Pathology was always vigorously efficient. Lawrence E. Martin, MGH Associate General Director, with whom Dr. Castleman worked closely while Acting General Director from January through August 1972, recalled:

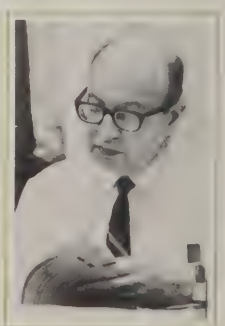
"He was the most conservative man when it came to maintaining an efficient organization of medical care. He really ran a tight ship. I always knew that if Dr. Castleman even asked for a single microscope he desperately needed it."

Dr. Castleman tackled the job of Acting General Director with enthusiasm – an enthusiasm that survived even the tremendous pressure of simultaneously directing his department and the hospital as a whole.

"I really enjoyed it," he said. "I wouldn't have wanted to do it for the rest of my life, but knowing there would be an end point and having been at the hospital so long, I felt there were several things that should be done."

While Acting General Director, Dr. Castleman completed a number of ongoing projects and launched several of his own. After an exhaustive search, for instance, he found accommodations to replace the aging quarters provided for many MGH interns and residents. He accomplished that program at little added cost to the hospital.

Medical education, perhaps because of his own first brush with pathology as a student, has a prominent place in Dr. Castleman's views. He has expanded and constantly refined the pathology training program that is used both for residents and interns.


Autopsies give data.

As a result, the Department of Pathology has a record of which its retiring leader is justifiably proud. Roughly two-thirds of the 125 residents and interns who had their training there during his tenure hold posts

(Concluded on Page 8)

Unseen Caretaker to Expand His Role

Dr. McCluskey

There is one kind of physician on the health-care team whom the patient will never see.

Yet this doctor is a vital part of the care of almost every patient who enters the hospital. This specialist stands behind every other physician, often providing the definitive diagnosis of the patient's illness.

The home of this unseen caretaker at the MGH, the Department of Pathology, is about to undergo major growth planned by members of the department under the direction of the new Chief, Dr. Robert T. McCluskey.

To cope with the ever-widening scope of medical knowledge, he believes, the pathologist must become more specialized. Pathology as a whole, he maintains, must expand, taking in newly developing areas which, because of the pathologist's special expertise, belong to him. Both varieties of growth, he said, will ultimately benefit the patient.

Though the peak of his career still lies ahead, Dr. McCluskey, 51, already has a distinguished background. Most recently he has served as S. Burt Wolbach Professor of Pathology and Pathologist-in-Chief at The Children's Hospital Medical Center in Boston. From 1968 to 1971 he was Chairman of the Department of Pathology at the State University of New York at Buffalo. Before that, he spent many years at New York University School of Medicine and served as Director of Laboratories at University Hospital, New York University Medical Center.

The new Chief of Pathology believes that the MGH is the ideal setting for the kind of expansion he envisages for his field.

"Principally," he said, "because the MGH is not only a very great hospital but also is large enough to support the kind of specialized department that I believe is necessary to provide the best diagnostic service and residency training program. Furthermore, there is such a long-standing tradition of excellence in the Department of Pathology that it should be possible to continue to attract outstanding staff."

In his new position Dr. McCluskey plans to add significantly to the patient-care facilities of the department. In the past, he said, the department has attained a high degree of excellence in this regard. He believes, however, that pathology must further widen the scope of its diagnostic activities.

In diagnosing disease, the pathologist has several tools available. One, of course, is the autopsy. This involves examination of a patient who has died.

With its careful study of diseased tissue, the autopsy may help clear up questions regarding the patient's diagnosis and treatment. Furthermore, studies performed at autopsy may provide important information about the nature of the disease.

A similar examination of diseased tissue, performed for a living patient, often allows the pathologist to see the patient's disease with his own eyes. In the biopsy a tiny fragment of tissue removed during surgery undergoes scrutiny.

The surgeon sometimes stands by the patient in the operating room awaiting the biopsy result while the tissue specimen is rushed to the laboratory for analysis. The outcome may decide whether or not the patient requires further surgery.

Dr. McCluskey plans to increase facilities for patient care in several ways. The use of electron microscopy in diagnosis will be expanded, principally in the field of kidney disease and in certain kinds of tumors.

A special laboratory will be established for the study of bone disease. Histochemistry, a branch of histology concerned with identifying the presence of enzymes in tissue, will receive special emphasis during this growth.

Dr. McCluskey also intends to expand the use of immunofluorescence. This technique, which permits detection within tissues of specific proteins, such as immunoglobulins or complement components, has particular application to the study and diagnosis of kidney disease, one of Dr. McCluskey's major concerns.

To accomplish this kind of growth, members of the Pathology Department working with DeLanson Y. Hopkins, Director of Medical Support Services, are planning the expansion and extensive renovation of the existing space in the Warren Building. In addition, new research space will be available in the Cox Center now nearing completion.

In another boost to the department's diagnostic strength, the new Chief will be recruiting several pathologists.

He has already persuaded Dr. Atul Bhan to accompany him from Children's Hospital. Dr. Bhan will devote much of his time to one of Dr. McCluskey's major areas of research interest, cell-mediated immunity.

This type of immunity is dependent upon a variety of white-blood cell known as the T-lymphocyte. The rejection of skin grafts and the suppression of viral infections are among the types of immune reactions T-lymphocytes are thought to bring about. Although initiated by a small number of specifically sensitized T-lymphocytes, cell-mediated reactions are characterized by the influx of numerous other white-blood cells.

Dr. McCluskey is especially interested in the factors that control the emigration of different types of white-blood cells in various forms of cell-mediated inflammatory reactions.

Another area of interest of Dr. McCluskey is kidney disease, especially types mediated by immunologic mechanisms. There is considerable evidence that most cases of glomerulonephritis (probably the leading cause of chronic kidney failure) are due to the deposition within glomeruli (structures within the kidney) of antigen-antibody complexes (immune complexes) formed in the circulation.

"The important thing now," he said of this area of research, "is to discover what the antigen is. In the overwhelming majority of cases of glomerulonephritis in man, we don't have a clue as to its nature.

"From experimental models, it seems possible that in some instances the immune complexes contain viral antigens resulting from chronic viral infection. In other instances the antigen may be a normal constituent of the body, which reacts with an autoantibody in the circulation."

Dr. McCluskey is also particularly interested in a number of research projects now under way in the MGH Department of Pathology.

Planning expansion

Within the department, he hopes to see an increase in several varieties

(Concluded on Page 8)

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Castleman Principles Set Apart Trainees

(Concluded from Page 6)

in academic institutions. Fifteen have been or are chairmen of departments of pathology at universities. Others are chief pathologists at community hospitals.

As a token of their esteem for their former mentor, members and former members of the Department of Pathology commissioned a portrait of Dr. Castleman to be painted by Pietro Pezzati. It now hangs appropriately beside that of Dr. Tracy B. Mallory in the Mallory Library of the Department. Dr. Castleman himself, who joined the Harvard Medical School faculty in 1935, was appointed in 1970 to the prestigious Harvard chair of Shattuck Professor of Pathological Anatomy.

As Dr. Castleman leaves his post as top MGH pathologist, he sees great changes ahead for his field.

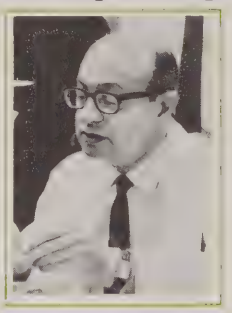
"The pathologist at the large teaching hospital of the future," he said, "will be much more specialized than pathologists have been for the past 25 years."

While considering it important for each pathologist to have special expertise in one area, Dr. Castleman is concerned lest the generalist in this field vanish completely. Specialists, he said, might not discover disease that affects several systems of a patient's body.

In addition, he pointed out, smaller hospitals still need generalists. To train them, the teaching hospitals will require other generalists.

Dr. Castleman's postretirement plans are many and varied. He will remain in Boston and at the outset will have an office in the hospital's quarters in Charles River Plaza. He will carry out projects for the administration and will consult on some of his special interests in pathology.

Additionally he will accept an occasional visiting professorship or help with medical school and hospital teaching programs. His lectures will come at the invitation of his former trainees, who, according to one MGH pathologist, "have been marked by the Castleman philosophy of pathology."



Dr. Castleman in the laboratory

Dr. Castleman as an Editor

In a lengthy editorial last month the *New England Journal of Medicine* said of Dr. Benjamin Castleman:

Imagine, then, the gargantuan task of preparing manuscripts . . . and submitting them without fail and on time over a period of 23 years – a total of about 1,200 manuscripts comprising about 2,000 case reports. But this is an achievement that, among his many other accomplishments, Benjamin Castleman can look back on as he retires this summer. . . . The clinicopathological conferences published by the *Journal* during the Castleman regime have been ineluctably marked by the man's stamp. . . . It was he who selected the cases and the discusser, who trimmed off the fat, and who, often as not, delivered the devastating denouement.

McCluskey: Probing Kidney-Disease Ills

(Concluded from Page 7)

of research activity. He will encourage increasing cooperation between pathology researchers and investigators in other specialties.

In the training of residents in pathology, the new Chief will also lay greater stress on specialization. However, he recognizes the importance of a good general training in pathology and cites the need for expert generalists as well as specialists.

Dr. McCluskey is a man with strong ideas about the directions pathology must take. His ambitions as MGH Chief of Pathology reflect those ideas.

"For a long time," he said, "pathologists have relied on relatively few and unsophisticated techniques and have attempted to be generalists in an era of increasing specialization. Pathology must change."

Dr. McCluskey in the office

New Look at Brain Disease

(Concluded from Page 5)

"I think time will show that if the community is to be served in full there will have to be many more units than now being envisaged."

A reliable measure of the minimum number of machines a community needs, he said, would be the number of ordinary skull X rays done each day for suspected disease within the head, divided by 15 or 20 – the practical C.T. scanner patient capacity per day.

In its first year at the MGH, Dr. New said, the scanner has proved that it will be a major part of diagnostic radiology in the future.

When the scanner was first installed, it was said that the new method "is probably the most dramatic and revolutionary single advance in diagnostic radiology since Roentgen's discovery of X rays in 1895."

If this early statement is an exaggeration, Dr. New said, it is only a mild one.

(End of Series)

MGH News

Vol. 33 No. 7 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS October, 1974

Pioneering in Substitutes for Donor Transfusions

Where Crisis Loomed, Regular Care Reigns

From the roof of Remick House, a onetime student nurses' residence which tops a hill in Chelsea, the view is panoramic.

To the south the Boston skyline looms beyond the homes, warehouses, fuel tanks, and waterways. Lost against Boston's horizon is the MGH, a torturous three miles away in rush-hour traffic.

For years, because of a serious shortage of local physicians, many of Chelsea's 30,000 residents had to make that three-mile trek to see a doctor.

From the Remick House roof today, however, an MGH physician is no further away than a flight of stairs. In December that building, newly remodeled, became the permanent quarters of the MGH-Chelsea Health Center. While maintaining its strong commitment to children, the facility opened its doors wide to adults for the first time.

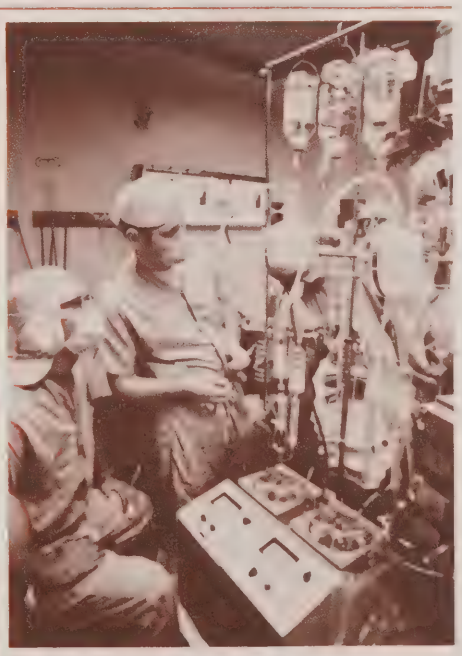
The MGH installation may have arrived just in time to avert a health-care catastrophe in Chelsea. A year ago the city's inhabitants, many of whom have an annual income of less than $5,000, could look to only 17 local doctors for outpatient care. At least half of these physicians were nearing retirement, and there was no prospect of anyone replacing them.

As their only recourse thousands turned to the MGH Clinics and Emergency Ward. Without cars, many faced a costly taxi ride over the Mystic River to get there.

Because the hardworking Chelsea doctors were unable to cope with the overwhelming demand, a number of persons failed to see a doctor regularly. One middle-aged man, a new patient at the MGH-Chelsea Health Center and prominent in his community, had not been examined in 14 years. The MGH physicians staffing the facility have uncovered long-standing cases of heart disease, cancer, and other serious illnesses.

"There is drama," said Miss Eleanor Clark, the complex's Administrative Director and Director of the MGH Department of Social Service, "but that's not the major daily fare of the health

(Continued on Page 2)



Under the careful scrutiny of Jeffrey K. Raines, Ph.D. (right), and a technician, an autotransfusion machine collects, processes, and reinfuses blood the patient is losing during surgery.

Man has devised three techniques to substitute a patient's own blood for donor transfusions needed during surgery. In all three, the MGH is making pioneering contributions.

The approach, known as autologous transfusion, is helping to reduce the strain now being placed on the limited resources of blood banks. By restricting the patient's exposure to donor blood, the autologous techniques also lower the slight risk of transmitting hepatitis and often present other surgical advantages.

Doctors frequently use the three methods in various combinations, either with each other or donor transfusions. The decision on which approach to employ is based on the needs of the patient.

Preliminary studies at the MGH have indicated that in certain types of surgery, the use of all three techniques together may entirely replace donor transfusions.

One of the three types of autologous transfusions is called acute hemodilution and has two variations. During an operation the blood lost can be replaced with a salt or protein solution. Alternatively some of the patient's blood can be collected and replaced with one of the two solutions after the patient is anesthetized, but before surgery begins. The collected blood is reinfused once the major bleeding from the operation is under control.

Hemodilution is the most widely utilized of the three methods at the MGH and is still growing in the number and extent of its applications.

In another type of autologous transfusion, known as intraoperative auto-

(Continued on Page 4)

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EDITORIAL:

A Remarkable Beginning

Chelsea is a courageous city of 30,000 people who over the years seem to have been visited by some of the 10 plagues. Twice in this century – once recently – catastrophic fires have flattened huge sections. And twice the city has bounced back from adversity. Even without the ravages of fire, the populace knows financial hardships.

Partly because of economic conditions, Chelsea has also suffered from a major health problem. Badly overworked, the private Chelsea physicians have struggled to cope with a staggering patient load. As a page 1 article in this issue of the *MGH News* points out, the result was a sizable group of area residents who had not had a physical examination in years.

A survey conducted about two years ago for the Mayor's Committee for Medical Evaluation and Development showed that 37 percent of the residents responding felt that obtaining medical care was a problem. For the city's 6,000 Spanish-speaking residents, the difficulty was magnified. Of those responding to the survey (conducted by Thomas F. Sullivan, now Director of Long-term Care Standards Enforcement of the Regional Office of the Department of Health, Education and Welfare), more than 80 percent said they had major problems in obtaining medical care.

One would expect a host of illnesses to arise from these circumstances, and that is the case. In 1966 the MGH examined 348 Chelsea schoolchildren. One-third had a visual problem. One in ten had suffered from hearing loss. Seventy-seven percent needed dental care. Sixteen percent had speech defects. Sixty-one percent had a significant emotional and/or intellectual problem. In 1972 the city screened a large elderly population for hearing, tooth, eye, and foot problems. Eight out of ten of all those screened needed care for at least one of these areas. Forty-two percent of those responding said they had no doctor at all.

Since the MGH-Chelsea Health Center opened a year ago, the city has had a new health resource. With the close cooperation of the mayor, Chelsea Memorial Hospital, and a host of agencies and citizens, the center has already grown rapidly. The people have found a valuable new system of care and have expressed pleasure with it. In turn the facility has been delighted with the response and has embarked on staged expansions of services that are sometimes quite innovative. A year is not an eternity, but for Chelsea and its new center the past 12 months have been a remarkable beginning.

Extensive Backing Makes Possible Regular Care

(Continued from Page 1)

center. The center's real work is getting people to come so that disease can be identified and treated, and complications prevented."

Reaction to the center has been overwhelmingly favorable – so favorable that a waiting list had to be initiated. When the facility opened in its new quarters in December, it expected a slow stream of first-visit patients. Instead a flood of enthusiastic people has inundated the clinics and sent administrators scrambling to find new medical staff. Some patients have come from the nearby cities of Revere, Winthrop, and Everett.

June, for example, the center's sixth full month of operation, saw more than 2,000 patient visits – a number far exceeding the most liberal predictions.

The MGH first began planning the health center a number of years ago. A special committee, formed by Chelsea Mayor Philip J. Spelman to look into ways of alleviating the city's health-care shortage, requested that the MGH set up such a facility.

Until opening in permanent quarters last December, the center had operated in temporary ones at Chelsea's Horace Memorial Baptist Church. Since beginning as a well-baby clinic in 1971, the unit has gradually expanded, first taking in children, then adolescents, and later, adults on a limited basis.

Now open 60 hours a week, it offers a wide range of services. They include internal medicine, pediatrics, children's dentistry, nutrition, social service, speech therapy, obstetrics and gynecology, dermatology, podiatry, and psychiatry.

The plan is to add services and staff as needed. The center recently appointed a podiatrist (foot specialist) and a new internist to its staff.

Like its trailblazing Charlestown neighbor, the MGH-Bunker Hill Health Center, the Chelsea program has welcomed support from many quarters and is working with an army of cooperating agencies. In sheer bulk and extent of support and cooperation, Chelsea is unusual.

At Mayor Spelman's direction, the city now provides Remick House with free snow removal and water. The city

Mrs. Jean R. Delaney, RN (right), an MGH-Chelsea Health Center nurse practitioner, diverts the attention of Jo Ann Daniels of Revere in preparing her for a routine ear examination, while the infant's mother, Mrs. Jo Ann Daniels, holds her.

Dr. Esperanza I. Cabral (left), an MGH-Chelsea Health Center physician, discusses the care of East Boston resident Mrs. Anna Miraldi.

also collaborates with the health center to provide transportation for patients from Bellingham Square to the health center and Chelsea Memorial Hospital.

Situated across the street from the center, that hospital leases Remick House for a token one dollar per year. The hospital also offers clinic doctors and nurses the use of its X-ray and laboratory facilities. Thus the center avoids duplicating the costly equipment which Chelsea Memorial already has.

Numerous agencies work with the Chelsea center. They have such specialized purposes as that of the Chelsea Childhood Lead Poisoning Control Program, for which the MGH provides both backup treatment and some support for testing. The Visiting Nurses Association has a contractual agreement with the Chelsea clinic to make home care available to the elderly.

The sources of center funding are also myriad. Among them are the federal government, charitable corporations, and foundations.

Direct MGH backing comes in the form of a trust fund established for the support of convalescent care. Once this fund supported Storrow House, the MGH convalescent facility, since phased out of service. In granting the request of the MGH to use this money in Chelsea, a Massachusetts court recognized that modern convalescence takes place in the community.

Despite the extensive financial backing, the center still has to stretch precious health-care resources a long way. To this end it strives to utilize allied professionals, such as the nurse practitioner.

"The nurse practitioner provides direct patient care to the greatest extent possible," Miss Clark said. "For many patients she may be the primary caretaker. With a diabetic, for instance, the nurse practitioner might very well care for the patient for the majority of his visits. He need only occasionally see an internist for an examination or when some new problem develops."

A team approach receives strong emphasis, said Dr. Andrew D. Guthrie, Jr., the center's Medical Director. So does family-based medicine. The same caretaker, whether it be internist, nurse practitioner, social worker, or another, sees all the members of a family.

Though none of these staff people constitutes a formal team, Dr. Guthrie explained that they meet frequently to discuss a particular family or one of its members.

Because Chelsea embraces a large Spanish-speaking community, the MGH has striven to hire Spanish-speaking staff members. One physician at the center speaks Spanish. Several of the nonprofessional employees speak Spanish, too, and can interpret for the other physicians.

The clinic's administrators have also attempted to employ as many persons as possible from the Chelsea community. Unemployment in the city is high, and wages low. Finding local or Spanish-speaking professionals has proven a challenge.

Chelsea's average per capita income of somewhat more than $5,000 poses special problems for the facility. Low incomes, ineligibility for federal health aid, and poor employment benefits leave an estimated third of Chelsea residents without health insurance.

The center has a scaled fee schedule. Depending on his income, the patient may pay as little as one-third of a full fee. However, a pride which permeates the community is in evidence. While Administrator Bayard Ewing estimates that almost a quarter of the center's patients should be eligible for some type of reduction, only 25 of 1,000 have taken advantage of one.

To encourage community involvement in the center and a community voice in its decisions, the MGH has established a patient-nominated and -elected Community Advisory Board. It includes two appointed MGH representatives: Miss Clark and Mrs. Jane Claflin, a trustee. Its nine Chelsea members, Mrs. Florence Baronoffsky, Mrs. Constance Caloggero, Mrs. Gertrude Cosgrove, Mrs. Helen Zucco, Mrs. Helen Hederson, Mrs. Ada Pechner, Lawrence Berman, Roberto Sotelo, and John Scrivano, provide community feedback on the center. Mr. Scrivano chairs the group and Mrs. Caloggero and Mrs. Hederson represent Chelsea Memorial Hospital.

In the months to come the program can take a number of directions. "We are exploring the possibility of branching out into health education," Dr. Guthrie said.

In many ways the Chelsea clinic is modeled after the MGH pilot facility in Charlestown. In some respects, the Chelsea unit is itself pioneering. Under a grant, for instance, it will develop a model community health-care system for the elderly (see page 7).

Whatever the offshoots of the center, many view its present accomplishments with pleased astonishment, as reflected in the frequent question, "Are these really MGH doctors, right here, in my hometown?"

DONOR SUBSTITUTES:

The Operating Room's Alternative "Energy"

(Continued from Page 1)

transfusion, MGH surgeons use a special device to retrieve blood lost during surgery and pump it back into the patient. Because of its complexity this technique finds little employment outside the major medical centers.

In the third autologous method, the patient makes donations of his own blood for several months before surgery. By freezing it, a blood bank can preserve it until he needs it in the operating room.

Frozen-blood autologous transfusions are uncommon. They were originally used exclusively for patients with very rare blood types but are now employed for some elective surgery as well.

Dr. Charles E. Huggins, Director of the MGH Blood Bank, developed the first practical way to preserve blood by freezing it for long periods. Without the process he created, stored blood remains usable for only 21 days. With his process the MGH became the first hospital to use frozen-blood autologous transfusions.

Several years ago scientists believed that blood could be preserved by chilling it to more than 100 degrees below zero. Those temperatures, however, damage the red-blood cells. Researchers then discovered that they could protect the blood during freezing by mixing it with a sweet, syrupy, clear liquid known as glycerol. But glycerol, if mixed with transfused blood, would be toxic to the patient.

Taking these discoveries one step further, Dr. Huggins devised a practical technique for removing the glycerol from blood before transfusing it.

Frozen autologous blood made a dramatic appearance on the MGH scene. In 1965 an 11-year-old boy in need of a lifesaving operation to correct a heart defect presented MGH physicians with what looked like an insoluble problem: While he would need about 10 pints of blood during surgery, his blood type was AB I-negative – shared by only two other persons in the country. The solution: For a year prior to his operation, every month he donated a pint of his own blood to be frozen.

As safe, simple, and dramatic as it is, this technique probably has the narrowest field of use. It is obviously limited to elective surgery – that which can be put off for some time. Though this restriction alone would leave the door wide open, the constraints of limited blood-bank space leave it only slightly ajar.

If the MGH welcomed with open arms the blood of all elective-surgery patients, Dr. Huggins said, it would have to provide enough storage space to refrigerate the equivalent of a good-sized downtown hotel each month.

Autologous frozen-blood transfusions, said Dr. Huggins, Associate Professor of Surgery at Harvard Medical School, occur more often by chance than plan. The MGH encourages persons with rare blood to make regular donations, even if no surgery for them is in sight. This blood might be used to save either the donor or another patient with the same blood type.

An estimated 150 persons with rare blood make periodic donations at the MGH.

One further drawback limits this approach. Before being frozen, blood is broken down into its various parts. While the oxygen-carrying red cells and volume-expanding plasma can be preserved at extremely low temperatures, another component, platelets, cannot.

Dr. Huggins' work made autologous frozen blood available only within the past decade. By contrast, hemodilution has been in use for over half a century. It is no coincidence that it came on the scene when the use of general anesthesia had become commonplace.

Hemodilution is based on the discovery that the human body, which ordinarily requires a large number of red cells when using much oxygen during exercise, needs far fewer red cells when at rest or asleep as in general anesthesia.

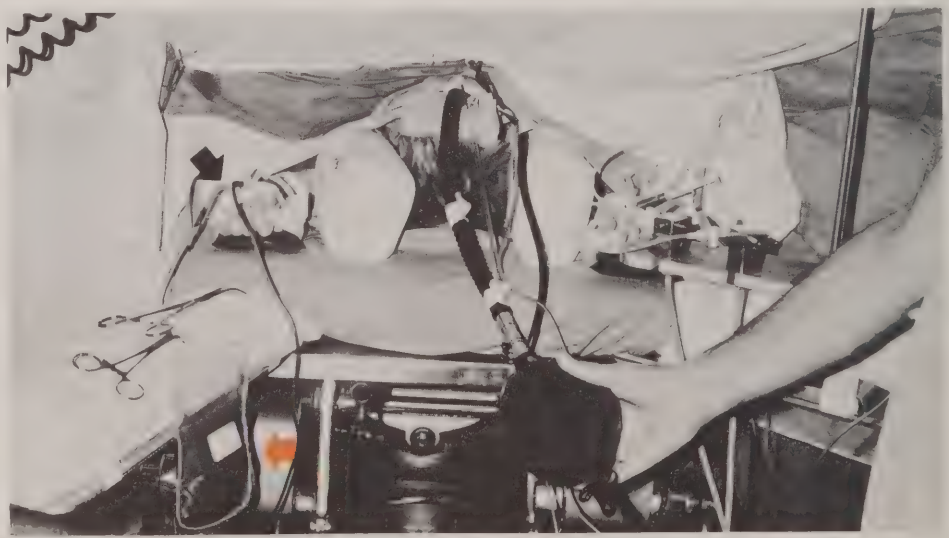
While the patient is anesthetized, doctors can safely dilute his blood. This action reduces the hematocrit, the percentage of blood volume containing red cells.

Dr. Myron B. Laver, an MGH anesthesiologist, in cooperation with an MGH heart surgeon, Dr. Mortimer J. Buckley, Jr., originally adapted hemodilution to conform to the tenets of the Jehovah's Witnesses, a religious group whose faith forbids the administration of blood or any blood products (December 1970, *MGH News*).

To comply with their objections to the use of "animal" products – the proteins found in most hemodilution solutions – the MGH doctors utilized a protein-free salt mixture. To meet a doctrine against shedding blood, the physicians used reservoirs in which to hold the collected blood and keep it connected with the patient throughout the early part of surgery. Thus the blood technically never left the patient.

Other hospitals now employ this approach to meet the needs of Jehovah's Witnesses and have used it for other patients in order to reduce their blood requirements. Drs. Laver and Buckley are among those now working to determine the limits of hemodilution.

Most of the 15 to 20 MGH patients undergoing open-heart surgery weekly are routinely hemodiluted beforehand.



Flowing from his arm (black arrow), the blood of an anesthetized patient collects in the bag (colored arrow) and will be replaced with a protein solution prior to surgery. The hand at right is squeezing an anesthesia bag to assist the patient's breathing during open-heart surgery.

During the operations these patients are maintained on a heart-lung machine (cardiopulmonary bypass). This device tends to damage platelets and red cells. Hemodilution allows some blood, stored in reservoirs, to remain virtually unscathed.

"We save as much of the patient's blood as possible," Dr. Buckley said, "by taking away an average of two units [pints] before putting him on cardiopulmonary bypass. When we have finished his open-heart procedure, we give him protamine [type of protein] to neutralize the heparin [substance to prevent clotting] in his blood. When clotting has been initiated, the patient's own blood is reinfused.

"If he has persistent bleeding difficulties, we give him fresh frozen plasma, red cells, or platelets."

How much hemodilution can the patient receive? How low a hematocrit will he tolerate?

"There are theoretical limits worked out in the laboratory," said Dr. Buckley, a Harvard Medical School Associate Professor of Surgery, "but we seldom have to reach toward these limits in a patient."

Normal hematocrit is 40 to 54 in men and 37 to 47 in women. MGH heart surgeons routinely hemodilute to hematocrits of 15 to 20. In one patient, a woman with a rare blood type and severe coronary-artery disease, they found it necessary to allow the red-cell count to fall to slightly under six. The operation proved successful, and she returned to her normal activities.

Studies by Dr. Laver, who is Professor of Anesthesia at Harvard Medical School, are providing some information about hemodilution's limits.

Intraoperative autotransfusion, the method now involving a special device, had been tried over the years. Then during World War II blood banking caught the public imagination. In the enthusiasm which followed, intraoperative autotransfusion was considered unnecessary. As a result the procedure lapsed in popularity for about 25 years. Two years ago, however, a California firm marketed a new, safer autotransfusion machine, reviving interest in the technique.

In 1972 the MGH joined a dozen other hospitals in evaluating the new device. Each institution tested its suitability for a particular type of surgery. Participating in this study were Jeffrey K. Raines, Ph.D., Director of the MGH Vascular Laboratory, Dr. R. Clement Darling, Chief of the MGH Vascular Clinic, and Dr. Bruce J. Brener, then an MGH fellow in vascular surgery.

In the MGH Blood Bank, Stephen F. Morefield, a technician, prepares for freezing a unit of blood with a rare factor.

In a carefully selected series of patients, they followed up animal studies done elsewhere by testing the machine's performance during abdominal aortic reconstructions – operations to remove a section of the aorta (artery leading from the heart) and correct an aneurysm (area of distended blood-vessel wall). For such surgery, the MGH doctors concluded, the device is suitable and useful.

In a recent series of over 50 abdominal aortic reconstructions performed by Dr. Darling, a combination of intraoperative autotransfusion, autologous frozen blood, and hemodilution completely replaced donor transfusions in the majority of cases.

"I think we will soon reach the point," he said, "at which nearly all patients undergoing abdominal aortic reconstructions will not need any donor blood."

For surgery involving moderately heavy blood loss, the MGH doctors believe, the machine can provide a hepatitis-free source of blood.

In many ways the apparatus resembles a vacuum cleaner. The device has a suction tip which sucks up spilled blood. The blood passes through tubing and special filters and collects in a reservoir. From there the machine pumps it back into the patient.

To bring added safety, Dr. Raines has modified this equipment. He included an optional second filter with microscopically tiny pores. To help minimize pump damage which tends to occur to red cells, he installed two pumps instead of the single roller device, a slightly improved suction tip, and a foot pedal allowing the surgeon to regulate suction.

The major problem of autotransfusion, Dr. Raines pointed out, is that because of pump damage the blood returned to the patient is not the same blood he lost.

"In our studies," he said, "we have found that as much as 70 percent of the red cells may be salvaged with a normal life span as documented by isotope studies."

Blood tends to clot when it leaves the intravascular spaces.

"There are two ways to get around this," said Dr. Raines, also a Harvard Medical School Instructor in Surgery. "One is to systemically anticoagulate [prevent clotting] the patient. If he receives injections of heparin, his blood will not clot either in or outside his circulation.

"Another is to regionally anticoagulate with an acid citrus dextrose solution the blood being retrieved."

Filters in the pump line of the machine help eliminate chunks of solid matter or blood clots. The autotransfusion device also has a warning system which clamps shut the tubing if it detects air flowing toward the patient.

Because of the effects of the machine over a long period of time, there is a

(Concluded on Page 7)

Finally, a Unit Management Plan That Works

Kay Griffin, RN, was beginning to wonder whether success was worth it. Her promotion to head nurse in the MGH's adolescent unit (Burnham Building, fourth floor) was taking her away from her chosen work – caring for young people. In her new position she became manager, traffic controller, accountant, and convener of auxiliary services.

Eight months ago Burnham 4 became the 37th unit to adopt a system of unit management that has a unique formula for coordinating the nontreatment activities on a patient floor.

All hospitals have had to experiment with methods of keeping the nurse from drowning under a flood of paper work. Efforts at the MGH began under the nursing department in 1963 and went through an arduous trial-and-error period. Each year the battlefield grew more cluttered with abandoned job definitions, techniques, and personnel.

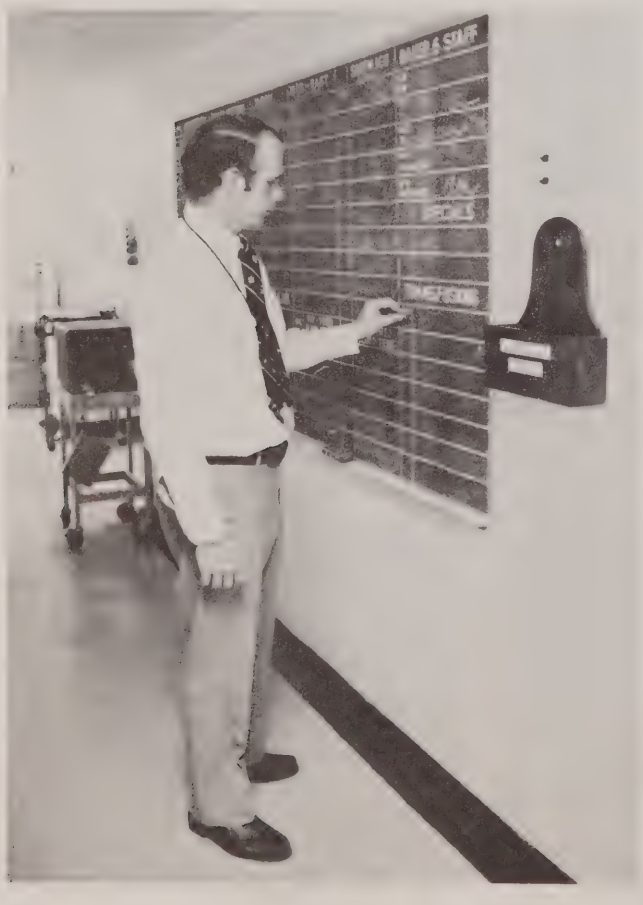
"Everyone agreed on the objectives," said Stephen Kauffman, Director of Clinical Administration, who was a unit manager during the experimental years, "but whatever methods were tried, the manager remained a dependent partner, and the nurse remained desk-bound. It became evident that a real transfer of responsibility needed to take place between nurse and manager."

The transfer came in 1967 when the unit manager was trained to transcribe doctors' orders for each patient. This is no mere routine task. It requires understanding the relationship of those orders and coordinating all the activities needed to carry them out from beginning to end.

"Transcribing orders provides an information base that gives the manager control over all the nonnursing activities of the unit," Mr. Kauffman said. "It brings him into a sphere of understanding formerly shared only by professionals."

The transfer of this responsibility to a nonprofessional was a bold experiment that challenged many sacred cows. The MGH was the first hospital in the country to attempt such a solution and the first to develop a sophisticated management system based on this principle.

"Once we found the key, the program started to grow like a brush fire," Mr. Kauffman said. The staff of Clinical Administration has almost tripled since 1968, when it became an autonomous department. Its 300 unit coordinators, secretaries, and assistants cover nearly every patient-care area of the hospital for 16 or more hours a day.



Edmund Steimle, Unit Coordinator, records doctors' orders for blood transfusions on a central board where the staff can check progress at a glance.

To win this acceptance, the unit manager, now called the unit coordinator, had to prove that his proficiency in managing was of the same caliber as the head nurse's skill in nursing.

"The unit coordinator must be a person of initiative and maturity with a definite commitment to work in the health field," Mr. Kauffman said. He or she is a college graduate with previous administrative experience, who goes through an intensive 10-16 week training program here and a year of apprenticeship before assuming full responsibility for a floor.

Barry Sales is the unit coordinator who set the system in motion on Burnham 4 at the request of Miss Griffin and the nursing service.

"It was already a well-run floor," he said, "but the nursing staff were too busy and concerned with patient care to follow up on the nagging minor problems that kept cropping up."

Mr. Sales has sought to transform his initial role as problem-solver to that of problem-preventer.

This means taking firm control of the environment by maintaining proper housekeeping, supply levels, and safety conditions. It means orchestrating all the nonnursing activities associated with a patient's stay from admission to discharge.

"To the rest of the hospital," Mr. Sales said, "you are the prime communicator and expediter. By transcribing doctors' orders, you have a bird's-eye view of all the needs of the unit. You become the liaison between the doctor and nurse and between the unit and all the support services."

Any set of orders, for example, may require coordination with laboratories for special tests, the blood bank for transfusion, radiology for X rays, and the dietary department for the patient's special diet.

One slipup in scheduling could postpone all related procedures, prolonging the patient's stay. The proper coordination of supplementary services, however, fully utilizes the MGH's resources, streamlines the patient's hospitalization, and minimizes expenses for both the patient and the hospital.

Two veteran support workers join

the unit coordinator to form each management team. They are the unit secretary, who handles much of the telephone and paper work, and the unit assistant, who attends to the environmental needs of the area.

Now in his seventh year as a unit coordinator, Mr. Sales has been a keen observer of the adjustments these support workers, as well as physicians and nurses, have made to the system. The unit secretary, who at first viewed the newcomer with misgivings, instead found her position upgraded.

Physicians tended to view the radical shifting of responsibilities with some skepticism. Most have been won over by discernible improvements.

"Physicians are concerned with what works," Mr. Sales said. "As soon as they saw the advantages of this system, they were extremely receptive. Their confidence can be measured by the performance they demand of us."

Even though the head nurse may accept the concept of the plan, working out the specifics can be trying for her. "I just started doing what I was trained to do, but Kay's role had to change dramatically," Mr. Sales said.

"It was hard to shake off the feeling of total responsibility for the unit," Miss Griffin agreed.

Freed from the burdensome management activities, the nurse leader can put her skills to maximum use in improving the quality of nursing care and encouraging the professional growth of her staff.

(Concluded on Page 8)

Donor Substitutes

(Concluded from Page 5)

limit to how much of a patient's blood can be transfused. Dr. Darling believes the safety limit may be one blood volume or about 12 pints, but a precise maximum has yet to be determined.

Loss of blood even approaching 12 units is rare during surgery. Such bleeding usually occurs only in patients with gunshot or stab wounds, auto accident injuries, or the like. In this kind of situation autotransfusion has proved extremely useful.

MGH doctors have been investigating other areas potentially suited to the technique. They have found it useful in a wide range of elective (nonemergency) vascular surgery. This type of operation involves heavy blood loss.

"Establishing when to use this procedure," said Dr. Darling, an Assistant Professor of Surgery at Harvard Medical School, "is very difficult, particularly at this hospital. We have such an excellent blood bank with just about any kind of blood available most of the time that occasions leaving no alternative to autotransfusion seldom arise."

The current supply and demand status of blood is compared by one of the pioneers in reviving autotransfusion to that of gasoline during the energy crisis.

In the eyes of many, the autologous techniques, though not the only answer to blood needs, are rapidly becoming the alternative energy source of the operating room.

Meeting with Stephen Kauffman, center, Director of Clinical Administration, are John Maghakian and Veetlyn Forde, left, and Starr Anderson, right. They supervise the coordinators, assistants, and secretaries who form a team on the unit.

Model Health System Will Serve to Benefit Elderly Lacking Care

Attempting to alleviate a serious health-care problem in Chelsea, the MGH-Chelsea Health Center has embarked on a program to reach the city's elderly.

About one Chelsea resident in five is 60 years or older. Illness or infirmity confines at home a good 13 to 20 percent of this group. A higher percentage has lacked continuous primary medical care for years.

Under a $488,000 grant from the Edna McConnell Clark Foundation, the MGH-Chelsea Health Center will develop a model health-care system for the elderly in Chelsea.

The center has mounted a massive campaign to find older residents who lack care. Involved are several social agencies and VISTA volunteers trained by Chelsea Memorial Hospital with the help of the health center. The center is coordinating the efforts of all organizations offering the city's elderly health-related and social services.

Supported by the foundation, practical training in the health needs of senior citizens will involve medical students, nutrition interns, student nurses, social work students, and others.

The Chelsea facility will study the financial aspects of the program, comparing its costs to those of the more traditional approaches to delivering care.

The health center will stress maintaining the patient in the familiar surroundings of his home. For the homebound, this emphasis will probably mean getting home care.

In the first six months of the new system, the center has concentrated on preparing for the outreach effort and training the staff. Meanwhile, about 550 of the roughly 5,500 Chelsea residents older than 60 have of their own volition registered at the facility. Since the elderly were expected to be slow to accept the idea of going to the center, this number has amazed many people.

Many of these patients, however, had not seen a doctor for years. Chronic disease, often in a late and serious stage, afflicted a large number of them.

The elderly's response to the health center so far has pleased the administrators and staff. But a firsthand look at the extent and degree of problems has been sobering.

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Training a New Breed of Health Manager

(Concluded from Page 7)

For Miss Griffin, relief from management also means more time to communicate with parents – an important aspect of pediatric nursing.

"Health-care delivery is increasingly becoming a team effort," Mr. Kauffman said. "Our method of unit management simply facilitates an ongoing process."

Now that the system has taken firm hold, it is producing unforeseen benefits that may have a dramatic impact on health care. One is the training of health managers.

"Clinical Administration is forming the nucleus of a new breed of manager," Mr. Sales said. "Many unit coordinators have master's degrees and consider this program a kind of internship in health management. Because they begin where the real action is – the patient-care unit – they are more aware of and responsive to clinical needs."

Mr. Kauffman points out that while the health field is the third largest industry in the United States, there are few undergraduate programs in middle management and even fewer positions that allow the graduate to develop health-management skills.

"Our system provides a manpower pool for the hospital," he said. "A number of unit coordinators have already been promoted to managerial posts in the hospital. Others have gone outside to manage group practices, neighborhood health centers, or nursing homes."

Clinical Administration plays a role in another area of increasing importance – control of hospital costs. The unit's budget may understandably have been the lowest priority of a head nurse. But the unit coordinator, as both chief accountant and manager of supplies and activities, is in a key position to identify where charges belong, making sure each patient is billed only for the items he uses.

In a broader sense, the manager's more efficient mobilization of support services allows maximum use of the hospital's resources and expeditious treatment of the patient.

Visitors from all over the world have come to the MGH to study the unique system of unit management. Mr. Kauffman estimates that 150 of the nation's 7,000 hospitals have a separate department of unit management and most have clerical employees on the units. But few have adopted the MGH model on a large scale.

Why did it take root here? Mr. Kauffman believes it is because the hospital made a serious commitment to giving real responsibility to the manager.

"We are fortunate in having an administration willing to give financial support and a nursing department with the foresight and boldness to set out on such a venture," he said. "The whole environment of the hospital is one of innovation."

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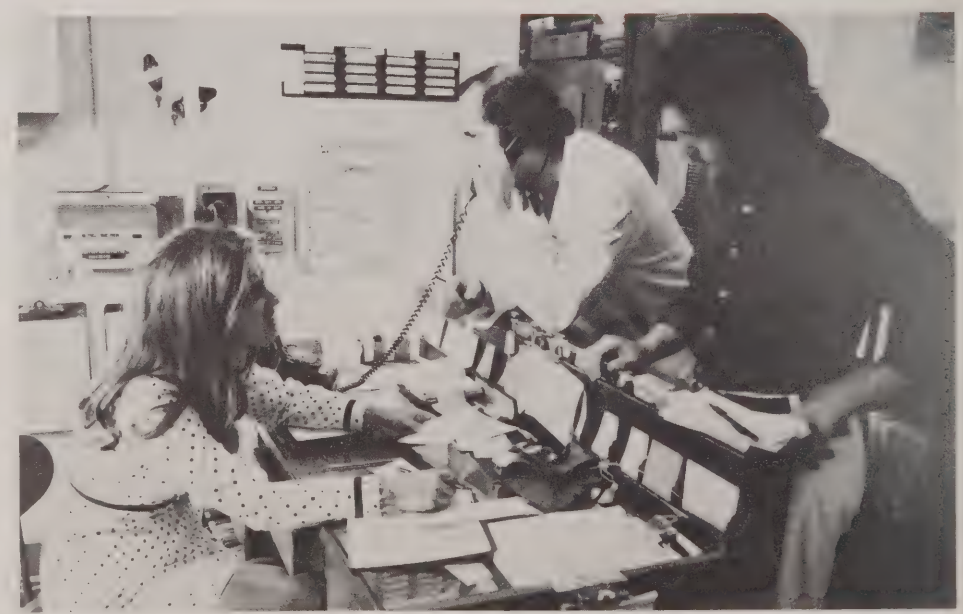

The desk of the Unit Coordinator, Gail Grootemaat, is the hub of action in this intensive-care unit. She discusses a physician's order with Fred O'Donnell, I.V. (intravenous) Technician, while Dr. Joel B. Levine answers a page.

MGH News

Vol. 33 No. 8 MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS November, 1974

Removing the Cloak of Mystery Enveloping Burns

Tailoring Treatment to the Alcoholic's Needs

When Frank was 25, he began drinking heavily. In the next 12 years, he hardly had a sober day.

Frank (not his real name) managed to hold jobs. He even spent some time as a bartender. But his drinking seriously jeopardized his health, and from 1965 to 1971 he bounced in and out of the hospital 14 times.

For the last two-and-a-half years, however, Frank has remained sober.

That happens to be exactly how long it has been since an MGH psychiatric nurse took over his care.

In a dramatic departure from his former treatment, she encouraged self-reliance from the outset. Instead of letting him throw back on her the decision of whether to join group therapy, she forced him to make the decision. He promptly joined the group on his own initiative.

Now he is working steadily and a member of Alcoholics Anonymous. When he attends meetings, he brings along friends with drinking problems.

Frank's story reflects a subtle but far-reaching change in the treatment of alcoholics. Known for at least a decade, this concept has only recently become fairly structured and widely accepted.

The alcoholic, his caretakers have come to recognize, benefits the most from an individualized, tailored course of treatment. Thus not all therapies help every patient. Indeed, some approaches may succeed only with a carefully chosen few. For Frank, for instance, the need was to make him more independent.

On the other hand, the skid-row alcoholic may need an elaborate system of rehabilitation involving a halfway house, vocational training, and Alcoholics Anonymous. The middle-aged alcoholic whose problem is serious but who still clings to a home and a job is most likely to benefit from Alcoholics Anonymous.

The patient in the earlier stages of his illness may fare better in a group which does not label its members as alcoholics. The more traditional forms of psychiatric counseling may also answer his needs.

"I think we're becoming more sophisticated in how we look at the alcoholic and the alcohol problem," said Dr. John A. Renner, Director of the MGH Alcohol Clinic. "We are better

(Continued on Page 4)

Given this choice under a special program, many alcoholics convicted of drunken driving chose treatment, which turned out to be highly successful.

The nation's first Burn Trauma Center will try to lift some of the shrouds obscuring medical knowledge about burns, thereby bringing about innovations in treatment. To this end a massive research project is being initiated at the MGH and the Shriners Burns Institute.

In naming the MGH and Shriners the first Burn Trauma Center, the National Institutes of Health (N.I.H.) has awarded the hospitals a three-year, $789,504 grant. This funding by the N.I.H.'s Institute of General Medical Sciences will support six individual but closely coordinated investigations. These efforts will involve three of the four major problem areas in the treatment of severe burns: lung damage, wound healing, and disturbances in the metabolism, the basic tissue-building and energy-producing mechanisms of the body. The fourth, postburn pain, is expected to become a future center project.

Directed by Dr. John F. Burke, an MGH surgeon and Chief of the adjacent Shriners Burns Institute, the center will draw on the skills of about 25 researchers. The Shriners will join with the MGH in all of the investigations, and its facilities will be used for every study.

Nutritionists at the Massachusetts Institute of Technology (M.I.T.) will collaborate in one project and assist in several others.

In designating the MGH and Shriners as the first Burn Trauma Center, the Institute of General Medical Sciences shares with many physicians the belief that the care of burn patients lags behind medicine as a whole.

(Continued on Page 2)

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EDITORIAL:

Man's Most Painful Injury

Burns are probably man's most painful injury. They are agonizing of themselves, but of necessity treating them inflicts still more pain. Not only that, but severe burns require months of expensive hospitalization. And after such a long period, just when a patient seems to be safely recovering, he often insidiously develops an infection and may die. When he does recover, if he has been the victim of extensive and deep burns, he may suffer from psychological scars caused as much by his physical appearance as by his experience.

Yet despite these discouraging facts, many patients recover surprisingly well and return to a meaningful and satisfying life. For this, one can thank hospitals like the Shriners Burns Institute and the MGH physicians who staff it. The MGH has itself contributed for several decades to a series of milestones in burn treatment. Since its founding only six years ago, the Shriners has also made many advances.

Now the two organizations are joining in a new and massive research effort supported largely by the federal government. A page 1 article describes how the National Institutes of Health has named the MGH-Shriners the nation's first Burn Trauma Center. The money funds only research, not patient care. Because both institutions – and especially the MGH – have comparatively few beds for burn treatment, only a relatively small number of patients can be admitted.

Even for those who gain admittance, in the months ahead many fruits of the new studies will probably come too late to help them. Yet there is hope that the investigations are destined one day to further strengthen two already acknowledged burn centers. In the process they would advance treatment of burns throughout the world.

Can Physicians Curb Evolution of Burns?

(Continued from Page 1)

"There are few illnesses in which there is so little we can do in a curative sense," said Dr. John D. Crawford, an MGH-Shriners pediatrician participating in the studies. "If the gallbladder is inflamed, the surgeon can remove it. If a bone is broken, the orthopedist can set it. Most medical crises are resolved within a few days. With a serious burn, however, the patient can remain critically ill for three or four months. This bespeaks the poverty of our knowledge."

Mystery, in varying degrees, cloaks almost every aspect of burn-patient care. This mystery begins virtually at the moment of burn.

Depending on the amount and type of heat, burns cause various degrees of damage to tissue. In many instances, only the outer layer of skin, the epidermis, is injured. But heat may also damage the inner skin (dermis), and may even penetrate to fat, muscle, or bone.

After this initial injury, some unknown process deepens the burn.

An MGH-Shriners pathologist, Dr. James B. Caulfield, will attempt to discover what causes the delayed damage and when it occurs. The hypothesis is that vasoactive substances, those which cause constriction or widening of the blood vessels, may be released by the burn, bringing a reaction which further injures surrounding tissue.

"The final lesion you get from a burn," he said, "is greater than the lesion which the initial heat damage causes. Obviously this is because the burn evolves over a period of time. The question is: Can one intercept this evo-

Letter to the Editor

Dear Editor:

As a medical student I was very interested in your article in the *MGH News* issue of Sept., '74 on the EMI scanner. However, you state in your editorial in the same issue that, "it has proved ineffective for diagnosing some disease processes." Could you advise what those disease processes were? More specifically, for example, has it been found useful, or useless, in detecting atherosclerotic degeneration of small arteries and blood vessels in the brain?

In appreciation of your valued comment, I am

Arch D. Hart
Dennisport, Mass.

(Editor's Note: The editorial referred to a relatively few brain conditions such as those outlined on page 5 of the September issue: intracranial aneurysms [a ballooning of weak blood vessels within the head], subdural hematomas [blood clots which form over the surface of the brain], and pituitary adenomas [a type of brain tumor]. In intracranial aneurysms and pituitary adenomas the scanner has often proved ineffective, and in subdural hematomas the scanner has occasionally been inadequate. As for atherosclerotic degeneration of small arteries, the scanner has proved useless except in secondary structural changes in the brain, such as swelling. Alternatively, the scanner has proved superior to the traditional diagnostic tools used for most other brain conditions.)

lutionary process and restrict the size of the burn?"

Another researcher, Dr. David A. Swann, a Shriners biochemist, will also look at what occurs in the dermis following a burn. With an eye to encouraging better wound healing, he will study changes in skin structure. His study, not funded by the N.I.H., is supported in part through a grant from the Harvard-M.I.T. Biomaterials Program.

In the lungs, burn injury can be as puzzling as it is in skin and underlying tissue. And these lung problems are very serious too, often causing early death. A group of investigators led by an MGH-Shriners surgeon, Dr. John M. Head, will study lung damage in burn patients.

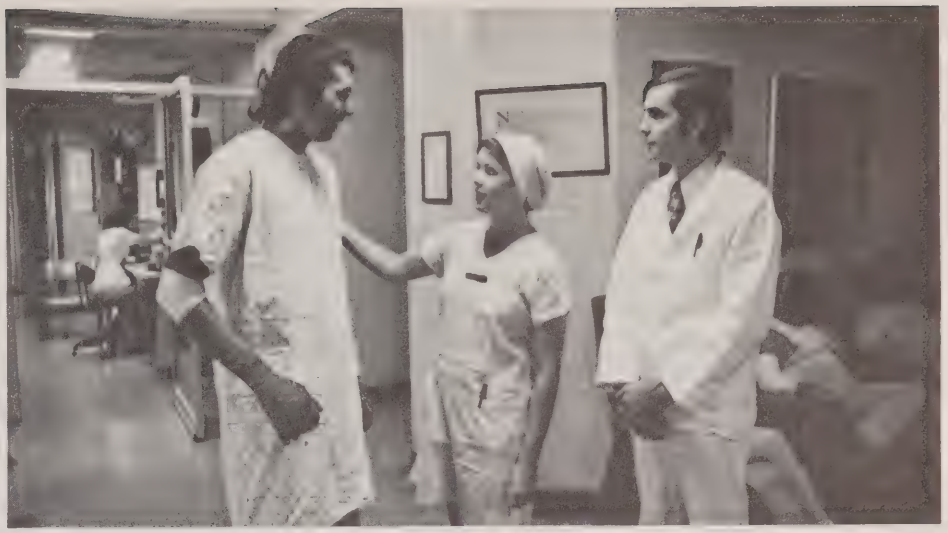
Lung problems related to a burn fall into two categories. Heat may directly affect the lungs. On the other hand, many patients whose burns could not have involved the lungs also develop lung difficulties. Researchers suspect a process (mediated by humoral factors) similar to that thought to occur in the skin.

Dr. Caulfield will look into this possibility. He believes the vasoactive substances may also be the culprits in this situation. There is evidence that in addition to their well-known function of respiration, the lungs process these compounds. If a burn somehow causes them to be overproduced or be released in large amounts, they might overload the lungs, interfering with the patient's breathing.

The seriously burned patient who survives the initial injury and respiratory problems still faces a long and precarious journey to recovery. Deprived of his protective skin cover, he is much more vulnerable to infection. Disturbed by the trauma of the burn, his metabolism races at two to three times its normal rate.

This speeded-up or hypermetabolic state causes nutritional difficulties, hampers the regeneration of damaged tissue, and weakens the patient, reducing his resistance to infection. If undeterred, this process can lead to the breaking down of tissue for use as life-preserving energy.

In recent years progress in controlling infection has been made through medication and protective environments. But the hypermetabolic state – its origins, its precise nature, and what controls it – remains a mystery.



Preparing to go home after a month at the MGH, burn victim James P. Jigarjian (left) says goodbye to Margaret A. Mahoney, RN, and Dr. William L. Smead. Mr. Jigarjian's stay was less than half the national average for burns as severe as his, but the MGH-Shriners Burn Trauma Center hopes eventually to shorten hospitalization even further.

The Burn Trauma Center will attack this problem from various directions.

During the hypermetabolic period, the amounts of a number of hormones in the patient's circulation are greatly increased. In addition, the body's reaction to some of the circulating hormones is altered. An Assistant Biochemist on the MGH-Shriners Children's Service, Dr. June R. Aprille, will lead an investigation of this phenomenon. With Dr. Hans H. Bode, an MGH-Shriners pediatrician, and Dr. Daniel F. Malamud, an MGH-Shriners biologist, she will scrutinize possible effects that altered hormone levels and changes in the cellular reactions to them may have on the metabolism.

The hypermetabolism also involves the liver. When affected, this organ produces amounts of urea (created from decomposing protein) and glucose (a blood sugar) far exceeding normal. A team under the direction of Julien F. Biebuyck, Ph.D., an MGH-Shriners anesthesiologist, will investigate whether this overproduction results from increased demand or directly from the burn.

Further, since burned patients must be anesthetized frequently for tissue cleansing, harvesting of tissue, and grafting, Dr. Biebuyck's group will also measure the effect of anesthesia on the production of urea and glucose.

Stepped-up use of oxygen and increasing need for calories in burn victims has led scientists to believe that the "breathing" of cells has increased greatly. The action of mitochondria, microscopic rodlike grains found in cells and involved in the body's use of oxygen to produce energy, will be the focus of a study by Dr. Aprille. Funding from other sources is being sought for her study, which was not covered under the Burn Trauma Center grant.

As part of the increased metabolism following a burn, the patient's system begins to break down proteins – particularly muscle proteins – at a tremendous rate. Though the body also increases production of protein, this "synthesis" is inefficient, resulting in a shortage of materials needed to regenerate tissue.

Examining this problem, a group of investigators will try to determine the extent and cause of the accelerated breakdown of proteins and will search for a way to intervene in the process and make it more efficient.

This team will include Dr. Burke, Dr. W. Allan Walker, Chief of the MGH Pediatric Gastrointestinal Unit, Ajit Kumar, Ph.D., an MGH-Shriners biochemist, Vernon Young, Ph.D., an M.I.T. Associate Professor of Nutritional Biochemistry, and Dr. C. Lawrence Kien, an M.I.T. Postdoctoral Fellow.

"There is some information," Dr. Walker said, "that factors released from tissues destroyed by the burns interfere directly with the synthesis of proteins. We're going to investigate to see if these factors are present in the serum of patients and experimental animals."

What these investigations reveal may

(Concluded on Page 4)

Center's Work May Continue for Decades

(Concluded from Page 3)

shatter a long-accepted belief about burn treatment.

"In the past," Dr. Walker said, "the theory has been that if a burn patient is using more energy, he needs more to replace that being consumed. So the tendency has been to give the patient enormous amounts of calories. Although this may turn out to be correct, it also may turn out to be simply throwing fuel on the fire."

In treating the burn victim's wounds themselves, physicians can play a very active role. Yet even here, major problems remain unsolved. Two studies, one by Dr. Robert B. Donoff, an MGH-Shriners oral surgeon, and another headed by Dr. Conrado C. Bondoc, an MGH-Shriners surgeon, will attempt to lift the shroud from these unknowns. Neither study receives support from the center grant. Dr. Donoff's derives funding from other sources, and Dr. Bondoc is seeking funding.

Dr. Bondoc's work is based on initial preliminary evidence that skin preserved in a tissue culture survives for long periods when transplanted to cover burn wounds. Eventually he hopes to develop skin grafts that could last for months, if not indefinitely.

Dr. Donoff will investigate the observation that full-thickness skin grafts (including dermis) prevent wound contraction while grafts with epidermis alone do not.

If he can discover precisely what causes this phenomenon, his work may lead to better healing of wounds, which in severe cases usually result in excessive scarring. In the future, the MGH-Shriners Burn Trauma Center hopes to enlarge its efforts in wound healing.

The researchers involved in the various programs expect funding for the project to continue beyond the initial three years. They view the work of the center as extending into decades.

As the more urgent problems of the patient's survival are solved, the investigators believe, they will shift emphasis to other concerns, such as the reducing of scarring and psychological aspects of burn care.

On another tack, a team is emphasizing safety to prevent burns in the first place. Under the leadership of Miss Elizabeth McLaughlin, Educator at Shriners, and Dr. Crawford, the group is developing ways to reduce the chance of burn trauma.

Under a hood which blows out sterile air to prevent contamination with bacteria, Ajit Kumar, Ph.D. (right), transfers cells to a receptacle containing fresh growth medium (food). Assisting him is a research technician.

Even If Involuntary, Treatment Can Succeed

(Continued from Page 1)

able to look at an individual and predict with a fair amount of certainty what particular treatment will be most successful."

A different breed of alcoholic, who is appearing for treatment for the first time, has helped foster this growing sophistication. Therapists are seeing a younger patient – one whose problem, though severe, is still in its first stage.

The younger alcoholic has always existed, but rarely sought treatment. A recent development, forcing him into therapy, has also upset a traditional belief about his disease.

Psychiatrists and others dealing with the problem have long felt that to succeed, treatment had to be voluntary. Two instances have now offered clear evidence that involuntary treatment can work.

One is the industrial alcohol program in large corporations.

"Once these companies become aware of a drinking problem which is affecting the work capacity of an employee," Dr. Renner said, "they give him the choice of getting treatment or possibly losing his job."

Most choose therapy, which has proved nearly 80 percent successful. This rate compares favorably with the results of treatment of the vast majority of other psychiatric illness. For the firms involved, the new approach has also saved some of the $9 billion alcoholism costs them each year. Reduced absenteeism and a lighter turnover more than pay for the alcoholism program.

In a special undertaking funded by the U. S. Department of Transportation, involuntary treatment has also helped persons convicted of drunken driving. The overwhelming majority of drunken drivers, many of them young, are alcoholics. The program, known as the Alcoholism Safety Action Project (A.S.A.P.), was tested in selected areas of the nation, including Boston, Brockton, and Lowell, Mass.

By agreement with the courts in these cities, persons convicted of drunken driving did not receive the usual mandatory license suspension. Rather, they were given a choice: Either enter treatment or have their licenses suspended.

When the mandatory suspension was in effect, police were reluctant to arrest offenders, and courts were loathe to convict them. Both knew that if the drivers lost their licenses, they might also lose their jobs, their homes, and their families.

As a result, the law's stiff penalty failed to deter the alcoholic. Untreated, he would return to the road again even

For a variety of reasons, young alcoholics have begun to appear for treatment in increasing numbers.

after several arrests. About half of the nation's highway deaths result from accidents involving drunk drivers.

While the A.S.A.P. was in effect in the Boston area, yearly drunk-driving fatalities dropped 32 percent. In unaffected portions of Massachusetts, meanwhile, such death increased.

"The individuals who entered treatment under this program were coerced," Dr. Renner said. "They came into therapy angry and hostile. They didn't want to be there, and they denied they had a problem."

Yet with many of these people, treatment succeeded.

In line with the current thought, the individualized treatment they received took any one of a number of avenues.

One approach popular in the past was the administration of a drug called antabuse. This medication, which makes the patient nauseous if he drinks alcohol, is still used. But antabuse had proved useful in a very small segment of alcoholics.

The patient has to be motivated and reliable enough to take the drug daily. Further, he should have a family or other persons who ensure that he takes it.

The medication seems to work best for the impulsive drinker, one who responds to a crisis by drinking, rather than a person who drinks heavily every day. The patient, however, cannot be so impulsive that even the threat of nausea does not deter him. Since many patients dislike antabuse treatment and do not ask for it, it is seldom used.

Another approach, teaching the alcoholic to associate alcohol with some unpleasant sensation such as mild electric shock, appears to have fallen out of favor. Known as aversive conditioning, this method works for a short time. In the long run, Dr. Renner said, the conditioning tends to wear off. Many patients drop out after finding the treatment too unpleasant.

A recent experiment, which involved taking films of the alcoholic while he got drunk and later showing them to him, also succeeded with but a few patients.

"For some," Dr. Renner said, "it was clearly very useful. But most people just wouldn't come back. It was probably too confronting, too quickly. Most people, because of what they are like when drunk, blot out how they behaved and have all sorts of fantasies about how they acted, but these have little basis in reality."

How does the alcoholic act while under the influence?

Dr. Jack H. Mendelson, a psychiatrist at McLean Hospital, Belmont, a psychiatric division of the MGH, has studied the behavior patterns. A high proportion, he found, grew more depressed as they drank. This observation clashes sharply with the alcoholic's assertion that he drinks to feel better.

Much of treatment today, Dr. Renner said, consists of talking to the alcoholic and gradually confronting him with the reality of his drinking. Such talk focuses on the negative aspects of his behavior. Thus, the psychiatrist might question the skid-row patient on what it feels like to lie in the gutter.

This is a simplified explanation of the therapy. In practice it becomes far more complex.

Except when compulsion through the job or courts is possible, getting the alcoholic to treatment continues to be a major problem. Prejudices which hurt the alcoholic and damage his place in society make it difficult for him to bring his illness into the open. To do so might cost him, among other things, his job.

The patient usually fails to admit he has a drinking difficulty until it reaches an advanced stage – if he admits it at all. All too often, Dr. Renner said, those around the alcoholic fail to recognize the problem.

Industry, the courts, and especially the schools, the Harvard Medical School Instructor in Psychiatry believes, must all strive harder to find the alcoholic and assist him. The National Institute on Alcohol Abuse and Alcoholism recently released figures showing that 23 percent of high school students in the nation showed signs of serious drinking difficulties.

"There's no question," Dr. Renner said, "that while youngsters are still in high school, you can identify individuals who are going to have serious drinking problems.

"With some it may be very obvious. They show up drunk in class. Others may turn up drunk at every social activity the school has. If anyone looked for such evidence, he could probably spot them without any difficulty.

"High schools must actively look out for these individuals and give them counseling or get them to treatment."

A Bias Toward Alcoholism

Recent developments in research show evidence of an inherited predilection for alcoholism. Investigators in Denmark found that children born to alcoholic parents and adopted in early infancy by nonalcoholic ones had a higher incidence of the disease than did children of nonalcoholics adopted in early infancy by alcoholics.

Although many alcoholics may be genetically biased toward the disease, Dr. John A. Renner, Director of the MGH Alcohol Clinic, believes that environment must be an important factor in its development. "A great number of persons," he said, "may have become alcoholics on the basis of environment alone."

An Inventive Mind That Wouldn't Give Up

When Yankee drive and ingenuity wage a lifelong battle against the knottiest problems of urology, that science is going to make some impressive advances.

The man who clutched the gauntlet is Dr. Wyland Fenway Leadbetter. In recognition of his contributions, fellow urologists recently elected him to two of the most important positions of responsibility in his field: the presidency of both the American Urological Association and the American Association of Genito-Urinary Surgeons.

He held these positions in what was to be the last year of his life. He died August 28 at the age of 67.

From 1954 until his retirement in 1969, Dr. Leadbetter served as Chief of Urology at the MGH. He brought to the department a rare combination of talents.

"Dr. Leadbetter was one of the gifted few who could be called a 'surgeon's surgeon,'" said Dr. W. Hardy Hendren, Director of Pediatric Surgery. "Other physicians sent him cases with complications that only a few people could have straightened out.

"In addition to being an extremely able technical surgeon, he was an innovator. At the operating table, when faced with a seemingly insurmountable problem, he would frequently figure out a way to handle it. He was not a person to give up."

This fertile mind was already in evidence during his training at Johns Hopkins Hospital where, as a chief resident of Dr. Hugh Hampton Young, known as the father of urology, Dr. Leadbetter was one of the second generation of physicians devoting themselves to this infant specialty.

There, in 1935, he was among the first to recognize that the narrowing of the renal (kidney) artery could cause high blood pressure and was also among the first to cure the problem by removing the patient's kidney.

The procedure for which Dr. Leadbetter is best known came to him in a barber's chair in Florence during World War II. He was, as usual, thinking about a urological problem – one called reflux, or backwash.

Dr. Wyland F. Leadbetter

The implantation of a ureter into the large bowel (ureterosigmoidostomy), a common operation, often failed because the contents of the colon washed back up the ureters to the kidney. Dr. Leadbetter thought of a method of tucking the ureters into the muscle bundle of the bowel so that a natural valve was formed.

The ingenious technique was to have a number of applications. One came in the mid-fifties at the MGH when Dr. Leadbetter was among the first to recognize that reflux from the bladder up to the kidneys is an important cause of kidney disease, especially in children.

With his colleague, Dr. Victor A. Politano, now of the University of Florida in Miami, he applied the same principle of ureteral implantation to the bladder as he had to the colon to prevent reflux. Now widely used throughout the world, the procedure was a major advance in reconstructive urology.

Dr. Leadbetter's technical skill and inventiveness were also brought to bear on the field of cancer surgery. Believing strongly in the radical approach, he perfected and popularized methods of totally excising the cancerous organs.

It is as a dedicated teacher, however, that he probably made his greatest personal impact and most significant contribution to urology. Eighteen of his former residents are now holding major teaching posts; twelve of these are heads of departments.

How did he attract these talented young people from general surgery to urology?

His interest was indefatigable and contagious. "He was around the hospital until all hours of the night talking about urology as long as someone would listen," said Dr. Walter S. Kerr, Jr., urologist. "He was happiest talking about it, thinking about it."

He loved to share his experience and knowledge with those who wanted to learn.

"It was not unusual to see him put in a 12-hour operating day on Saturdays," Dr. Hendren recalled, "and then on Sundays, to hold teaching conferences with the residents here and in the Veterans Hospital."

Dr. Leadbetter demanded excellence; in return he gave his thoughtful attention to the most difficult questions and his personal concern for the development of his students.

His associate of 16 years, Dr. Edward C. Parkhurst, recalls: "He would follow up on his residents, visit them, stimulate them. In turn, they would seek his advice about complex cases and problems. He was delighted when this happened."

Only two other attractions shared the devotion that Dr. Leadbetter gave to urology – his family, and his native Maine.

He was born in the small mill town of Livermore Falls in 1907 and graduated in 1928 from Bates College in Lewiston, where he later served as a trustee.

Early in his career he found his ideal retreat from medicine – a primitive, isolated camp at Lobster Lake. There he would hunt, fish, and work with his hands.

"Once he was asked if he intended to spend some time in Japan after giving a lecture," Dr. Parkhurst recalled. "He answered, 'There's only one place in the world that I would spend a vacation, and that's the state of Maine.'"

During his residency at Johns Hopkins, the young Dr. Leadbetter met Lois A. Billings, a neurosurgical scrub nurse. Their marriage, which produced three children, was exceptionally close.

Through his published articles (which numbered more than 80) and his activity in professional organiza-

"Surgery" on Model Precedes Real Operation

(Concluded from Page 8)

be severely handicapped, to live fully normal lives.

Different but equally difficult problems face prognathic patients like Kathleen Murphy, for whom both appearance and function may be severely compromised.

In such cases extensive technical work precedes actual surgery. Oral surgeons collaborate with orthodontists to determine the nature and precise location of the defect. Often they construct life-sized plaster models of teeth and jaws. Before the actual operation, "surgery" is performed on the model to preview accurately the changes to be made in jaw relationships.

Such care pays off. Notes one patient: "Every time I eat meat I am particularly thankful. Not only did the surgery give me a decent bite for the first time in my life, but it also had considerable psychological impact.

"Before the operation, I was shy and withdrawn – normally holding my hand close to my jaw, to hide it from view. But that has totally gone, and the discovery of self-confidence has played a significant part in my life in the six years since my surgery."

Cautions Dr. Guralnick: "Reactions like this are encouraging and highly gratifying but should not obscure the fact that orthognathic surgery is never a panacea for all the adjustment problems inevitably faced by patients with serious jaw deformities. They look better and function better, but they return from the hospital to the same old milieu – same job, same school, same family. Helping them successfully through this transition period is not the least of the oral surgeon's responsibilities."

And what of the lowly wisdom tooth? It turns out to be not so lowly after all; extractions comprise a significant part of any oral surgeon's work.

"I strongly believe," said Dr. Guralnick, "that it is just as important – and difficult – for our residents to learn to take out an impacted tooth well as it is for them to learn how to correct facial deformities."

Such extractions may range from a single abscessed tooth, or four deeply impacted wisdom teeth, to a full mouth, in preparation for dentures. Increasingly these procedures are being carried out on an ambulatory basis with general anesthesia being provided at the new MGH Surgical Day Care Unit.

The Oral Surgical Service at the MGH provides a good example of how this specialty of "hospital dentistry" fits into a large urban medical center.

Oral surgeons used this plaster model as a blueprint for an operation to correct a protruding lower jaw.

The service has clinic and Emergency Ward facilities and in addition admits between 700 and 800 patients each year.

"Often," explains Dr. Guralnick, "patients with serious medical problems are referred to the MGH for extractions and other relatively minor procedures because of the superb backup care offered by such an institution and its physicians. For debilitated elderly patients or hemophiliacs [persons with a condition causing bleeding], for instance, dental work can severely exacerbate the underlying disease."

In addition to seeing 10,000 clinic outpatients yearly, the six oral surgical residents treat dental problems at the Emergency Ward. Activity peaks at night and over weekends when an average of 75 patients may be cared for – over 15 percent of the overall Emergency Ward case load for such periods.

MGH oral surgeons are not involved in patient care alone. As with other MGH services, postgraduate education receives considerable emphasis.

Formal courses, offered in conjunction with Harvard School of Dental Medicine, attract dentists and oral surgeons from around the country. Additionally, informal lectures at the MGH give house officers and area practitioners a chance to meet both American and European leaders in their field.

Dr. Guralnick, who is Professor and Chairman of the Oral Surgery Department at the Harvard School of Dental Medicine, directs an MGH residency program regarded as one of the nation's best.

In addition to a standard, three-year residency, the hospital and Harvard have recently pioneered an experimental plan which incorporates the three-year residency, an MD degree, and a year of general surgical residency into a new, five-year program (April 1973, *MGH News*). Several of the 129 oral surgical training centers in the country are also experimenting with combined-degree programs.

"It may take ten years to assess its usefulness fully," said Dr. Guralnick, "but the concept of an oral surgeon who is dentally and medically qualified seems to be an idea whose time has come." Most oral surgeons recently completing the five-year MGH program have accepted academic positions.

---

tions, Dr. Leadbetter gained an international reputation as a leading urologist.

He served as chief of urology at five area hospitals and as consultant to several more, was once professor of urology at Tufts Medical School, and was cofounder of the first Veterans Urological Training Program in Boston at the West Roxbury Veterans Hospital.

During his tenure here as Chief of Service, he was also Clinical Professor of Surgery at Harvard Medical School.

A hard-driving, disciplined surgeon, Dr. Leadbetter was at the same time a man of warmth and kindness who would cheer up patients with a few words and show a generous affection toward his residents.

His close associates recall with a sense of wonder their visits with him during his final illness. His curiosity was undiminished.

"Even in the last few weeks of his life, he was always thinking about new ways to treat problems for which there is not really a good solution," Dr. Hendren said. "This inquiring mind was one of the things that set him apart from ordinary folks."

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Oral Surgery Treats a Variety of Problems

A fraction of an inch has – thanks to MGH oral surgeons – changed 23-year-old Kathleen Murphy's life.

She was born with a facial deformity known as prognathism with open bite, a lower jaw positioned so far forward that her teeth did not meet. In 1972, a team of oral surgeons removed a predetermined section of her lower jaw in a carefully planned, three-hour operation, moving the jaw back to achieve normal bite.

For the thousands of Kathleen Murphys with severely protruding or receding jaws and chins, oral surgery can provide a more harmonious facial appearance as well as newfound ability to eat normally. Although an oral surgeon more than a century ago pioneered correction of her particular problem, the operation has been routinely done in the United States only during the last decade.

"It's a procedure in which oral surgeons take pride and find considerable challenge," said MGH Oral Surgery Chief, Dr. Walter C. Guralnick.

Despite such operations even many professionals associate oral surgery with the extraction of the lowly wisdom tooth. In reality the specialty – particularly at centers like the MGH – embraces a much broader field.

What then is this branch of surgery? Recognizing that "oral" surgery extends well beyond the confines of the mouth, the American Dental Association has renamed the specialty "oral and maxillofacial surgery."

It includes care of facial accident victims, treatment of various jaw malfunctions, correction of facial deformities like Kathleen Murphy's, excision of a variety of oral lesions, and participation on oral-cancer treatment teams. In many of these areas the oral surgeon's dental training enhances the requisite surgical skill and knowledge.

"In a way," said Dr. Guralnick, "the oral surgeon bridges the gap between dentistry and medicine."

This dental background, with its emphasis on occlusal relationships (teeth and jaws and how they meet), is particularly called upon as the oral surgeon treats facial accident patients. Injuries range from dislodged teeth to multiple and severe facial fractures.

Kathleen Murphy before and after oral surgery

"The 70 percent of automobile-accident victims suffering facial injuries," Dr. Guralnick notes, "will often have multiple-system injuries as well. They deserve all the help modern medicine has to offer the severely ill. At the MGH they are often treated by teams on which most of the surgical subspecialties are represented."

Another jaw problem making up a sizable block of the oral surgeon's work involves various malfunctions of the temporomandibular (lower jaw) joints. These vary from chronic dislocation, often a sign of a psychological problem, to severe arthritis.

Such temporomandibular joint disturbance – whether triggered by arthritis, infection, old injury, or a birth defect – may make it impossible to open the mouth more than a fraction of an inch. Treatment for this joint "fusion" may consist of a procedure called arthroplasty. In this, the oral surgeon creates an artificial joint enabling the patient to move his jaw normally once again.

Removal from the mouth and jaw of cysts, noncancerous tumors, and some malignant tumors also forms part of the MGH oral surgeon's work. Even when not cancerous, such growths can enlarge and cause severe damage.

Occasionally definitive treatment requires removal of a large section of the lower jaw along with the tumor. To restore such patients to preoperative appearance and function, oral surgeons may replace all or part of the lower jaw with bone grafts. Usually these are taken from rib or hip bone and carefully shaped to fit the defect.

An even more recent technique uses a metallic mesh tray. Formed in the shape of the missing jawbone, this tray is filled by the oral surgeon with bits of grafted bone. Both methods permit patients, who would otherwise

(Concluded on Page 7)

MGH News

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If Any Indians Happen to Come In, Let Us Know

Striving for an All-Volunteer Blood Program

When the call went out for blood donations to save the life of a severely burned 12-year-old East Boston boy, scores flocked to the MGH to donate.

In May 1970, the Little League pitcher had reached through a fence to retrieve a ball which had come to rest near a high-voltage transformer. His left arm brushed against it.

Saving the youngster's life required 92 units of whole blood and 20 of volume-expanding plasma. Surgeons also had to amputate his arm. Further surgery was needed to close his burn wounds. Despite the loss of his arm, the boy later recovered fully from his burns. In fact he even played outfield in the East Boston Senior Little League in 1971.

During a crisis like the one created by the boy's transfusion needs, the MGH Blood Bank and Transfusion Service can usually expect numerous donations. Yet the unit cannot regularly attract enough volunteers to fill the hospital's more "routine" day-to-day needs.

The shortage of volunteer blood donors is a national problem, but it is compounded at the MGH by the very nature of the hospital and the kind of patient it most often treats.

Open-heart operations, total hip replacements, kidney transplants, various types of unusual blood diseases, complex injuries from car accidents, vascular (blood vessel) surgery, and severe burn cases are almost routine fare at the MGH. All require large amounts of transfused blood.

This great demand has made the Blood Bank the largest such hospital-based facility in the world. During 1974, the MGH will have collected about 40,000 units (pints) of blood. While the need for donors has risen steadily over the years, this figure represents a sharp increase over last year.

The number of donors required continues to rise despite greater efficiency in the MGH's handling of blood. In 1967 the hospital transfused about 90 percent of the units it collected. Much of the remaining 10 percent had to be discarded because it went unused 21 days after being drawn. Blood kept longer is normally unsafe for transfusion.

In 1973 the MGH used all but one-

(Continued on Page 4)

Joanne Scheirer, a New England Conservatory of Music student, arrives at the Blood Bank.

There are about 3,000 native Americans in Boston. Two years ago those who most needed help went to a hospital only in a crisis situation. But the story has changed.

The new patient is usually young, unemployed, often drunk. His family lives on an Indian reservation in Canada. He lives in a homeless men's shelter in the South End.

He comes to the MGH looking for two young women his friends call the "Albino" and the "Eskimo," for a bright, cluttered room they call the "Indian Clinic."

This is not like other clinics, his friends say. You don't need an appointment. You can rap about anything with two girls who value the Indian way of life. You can even come in drunk. But you will leave with a renewed sense of self-worth.

The "clinic" is the effort of two social workers in the Emergency Ward, Trudy Yukl and Robbie Klein. In the spring of 1973 they discovered that in the previous four years only four Indians had been referred to the Social Service Department. None had returned to the hospital for medical appointments.

The two women decided to find out why. "If any Indians come in, let us know," they told the staff. Their interest and commitment quietly gave shape to a referral and counseling center that reaches a part of the Indian population for whom most other efforts have failed.

Now, 18 months later, 54 Indian patients from 9 different tribes are followed on a long-term basis.

The young man described above represents a small but highly distressed

(Continued on Page 7)

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EDITORIAL:

A Legend in Maltreatment – One Answer

The American Indian is a legend in maltreatment. First the white man murdered him, then seized his land, and finally herded his survivors into concentration camps called reservations. Unmotivated, uneducated, he languished ignored. From time to time the Indian, groping for help, has cried out with the shriek of Greek tragedy. Occasionally the conscience of a nation has responded in a desultory way. More often Washington has promised a remedy and delivered a bone. Even those who mean well have foundered on the rock of good intentions. They have simply failed to understand the Indian and therefore his needs.

Now, not surprisingly, statistics compiled by the Federal Government indicate that the American Indian has been condemned to by far the worst health of all Americans. According to the government data, the Indians have 60 times more dysentery, 30 times more hepatitis, and 10 times more tuberculosis than other Americans. Even though their death rate has improved recently, this rate continues to outstrip by 40 times that of Americans as a whole.

On page 1 of this issue an article describes a program begun at the MGH by two members of the Social Service Department. The two women saw a vacuum and filled it. By struggling to learn the way of the Indian, they slowly came to know his fears and needs in order to relate them to the hospital environment. On this foundation of understanding and respect, they built an "Indian Clinic" which is serving the health and in part the psychological wants of some of Boston's most medically deprived. This is a treatment so individualized that it cannot, without dilution, be practically applied to large groups of people. To do so would require many workers, nonexistent space, and vast sums of money. What the "clinic" represents is the faith and dedication of two young women. Beyond that their labor serves as a reminder that to help, one must first understand. And to understand often demands faith and dedication. In a troubled time the story of the "Indian Clinic" is a refreshing one.

Bats' Navigation Tool Helps Cardiologists To Examine the Heart

What do bats and dolphins have in common with two MGH cardiologists? The echo of high-pitched sound.

Bats and dolphins use it to navigate and to locate food. Drs. Gordon S. Myers and Robert S. Lees of the MGH and Massachusetts Institute of Technology (M.I.T.) are employing ultra-high-frequency sound waves to examine patients with cardiovascular (heart and blood vessel) disease.

Dr. Myers, Clinical Director of the MGH Non-Invasive Diagnostic Laboratory, and Dr. Lees, the unit's Administrative Director, routinely use one variety of ultrasound in patient care. In the laboratory the physicians are experimenting with a number of more exotic variations of the technique.

Each of these applications of ultrasound involves using its echoes to create on an oscilloscope (a device that shows sound waves on a screen) pictures of some structures within the body.

At the MGH, the cardiologists are not the only ones making ultrasound pictures (June-August 1974, *MGH News*). But because of the needs of their field, the doctors concerned particularly with disease of the heart and blood vessels have approached the tool in a very special way. They are interested in movement – the motion of the various parts of the heart, the flow of blood in the arteries, and subtle changes in these which may reveal the presence of disease.

When used for examining the cardiovascular system, ultrasound is known as echocardiography.

The conventional method of detecting alterations in the movement or anatomy of the heart is a catheter angiogram study. This involves threading a tube (catheter) through an artery to the patient's heart. After passing radioactive material through the tubing, the examining physician can obtain a very complete picture with a rapid series of X rays.

Although catheter angiograms must be done frequently in hospitals like the MGH which perform a lot of open-heart surgery, the examinations expose the patient to a small amount of risk. Because of the contact with radiation, one patient cannot undergo an unlimited number of such studies.

Echocardiography, on the other hand, is "noninvasive." It involves no known risk to the patient. The ultrasound procedure also costs the patient about one-twelfth as much as a catheter angiogram.

Echocardiography, however, is unable at present to reveal the problem definitively in many types of heart disease. But it has developed sufficiently to be considered almost diagnostic – offering a high degree of assurance that a certain disease is present – in three relatively common instances.

One is mitral stenosis. In this condition blood flow from the left atrium (upper left chamber of the heart), which receives blood from the lungs, to the left ventricle (lower left chamber), which pumps it to the rest of the body, is obstructed by a malfunction in the mitral valve. Located between these two chambers, this valve causes the problem by remaining partly shut.

Echocardiography demonstrates clearly any abnormality in the movement of the flaps (leaflets) of this valve. In some cases the procedure proves valuable in indicating whether it requires surgery.

Echocardiography can also identify another mitral valve disorder. In the "click-murmur syndrome," the valve moves out of place during the contraction of the heart, producing a characteristic click and murmur which the physician can hear with his stethoscope.

In recent years physicians have begun to use echocardiography for diagnosing asymmetric septal hypertrophy, the abnormal enlargement of the septum, a wall which divides two sections of the heart.

In one other condition, Drs. Lees and Myers believe, ultrasound may strongly suggest a particular diagnosis. This is the rare occasion when a tumor or clot is present in the left or right atrium of the heart.

The MGH cardiologists have also found the technique useful in examining patients with pericardial effusions, a collection of fluid in an inflamed pericardium, the sac surrounding the heart.

These and other more limited uses for echocardiography are believed to represent only a fraction of its potential employment. Throughout the nation, researchers are pursuing a number of possibilities for special applications of the procedure.

In investigating these areas, physicians from the Non-Invasive Diagnostic Laboratory are cooperating on a wide

With an ultrasound device, Dr. Antoine Bloch, an MGH physician, examines the heart of Robert D. Parker of Centerville.

front with M.I.T. engineers. Supporting this research are grants to M.I.T. from the National Heart and Lung Institute and to the MGH from the Monell and Vetlesen Foundations. Each provides an average of roughly $400,000 a year.

At M.I.T., Dr. Myers is a Senior Lecturer in Medicine, and Dr. Lees, a Professor of Cardiovascular Disease.

Much of their investigative work involves applying to medicine the existing technical knowledge about radar and ultrasound-signal processing used in other fields. The bulk of this knowledge has spun off from space and military research.

The area of the MGH-M.I.T. investigations likely to bear fruit the earliest is known as pulsed, range-gated, Doppler ultrasound. This approach was pioneered by scientists at the Seattle Veterans Administration Hospital and the University of Washington.

"Pulsed" refers to the way in which the sound is sent off in bursts of 1,000 or so each second. In addition, since the doctors know the speed of ultrasound through the body's tissues, they can "gate" the returning echoes, only registering those which return at a given time after each pulse. Thus, they can focus on a specific spot in the body at a precise distance from the transducer, the vibrating crystal which produces the sound and receives the echo.

This approach also makes use of the Doppler principle, discovered by an Austrian physicist of that name in the 1840s. To an observer, the frequency of sound or light from a moving source appears to increase, if the object is approaching, and decrease, if it is moving away. The greater the speed, the greater the frequency change.

The Doppler principle holds true for echoes, as well as original sources of sound or light. Using ultrasound, therefore, doctors can determine the speed within the body of a moving object such as blood. If the physicians set the echocardiography transducer only to pick up sound at a particular movement-distorted frequency and use range-gating, they can examine a particular substance, moving at a precise speed at a given point in the body.

When developed, this technique is expected to be highly useful in examining arteries to detect blocks in blood flow.

One of the most promising potential applications of ultrasound is computer analysis of the echoes. From them the computer may be able to extract information, hidden from human observers, about the presence and nature of abnormal tissue. The abnormally large cells in a hypertrophied (overgrown) heart muscle, for example, might have some ultrasound characteristics which the computer could recognize.

"We're quite sure there's some specific information buried in the ultrasound signal," said Dr. Myers, a Harvard Medical School Associate Clinical Professor of Medicine. "We want to find out how much and how important it is."

(Concluded on Page 6)

Women Hold a Key to the Blood Shortage

(Continued from Page 1)

half of one percent of collected blood. At a time when an estimated 25 percent of blood obtained in this country is never transfused, the hospital's bank ranks among the world's most efficient.

To Dr. Charles E. Huggins, its Director, this added efficiency has helped in reaching toward one of this unit's long-term goals. Even in the face of rising needs, he is determined to assemble an all-volunteer donor force.

Since 1967, the Blood Bank has mounted an all-out effort to recruit volunteers. "We've tried every reasonable method to attract donors," said George A. Parkhurst, Blood Bank Community Liaison Officer. Mr. Parkhurst supervises the MGH's recruitment of groups of volunteers.

Appeals to groups have attracted special attention in the MGH campaign. Like most other institutions, the MGH has a group blood-coverage plan: If a group donates a number of units equivalent to 25 percent of its membership, each member receives for one year the same "blood insurance" as a donating individual.

For the covered individual, his spouse, children under 18, parents, grandparents, and spouse's parents and grandparents, the MGH guarantees free blood virtually anywhere in the world.

If a group of five or more donors, located within a reasonable distance of the MGH, requires transportation to come in and donate, the hospital will provide a free ride.

During the Christmas season, the MGH Blood Bank offers a gift plan. The volunteer who already has coverage can give in the name of another family, providing its members with free blood for a year.

MGH donor recruitment has made substantial progress. In 1967, the Blood Bank collected 721 units from volunteers. Last year 10,590 came from this source. It appears the number of volunteers will top 13,000 in 1974. At the same time, the hospital has compiled a list of 23,000 persons who have contributed blood.

Adding to the list proved difficult because many first-time volunteers tend to be apprehensive.

"Frankly," said one such donor, "I had a preconception of pain. I was very surprised that the closest thing to real pain was the finger prick when they had to test a drop of my blood."

Large populations of potential donors remain to be enlisted. Nationwide, for instance, women comprise about 20 percent of regular volunteers.

"If enough women gave blood to increase that percentage to 50," Dr. Huggins said, "it would go a long way toward solving the nation's blood problem."

An all-volunteer supply, however, may take years to achieve. Meanwhile, the MGH, like most hospitals, has to make up the remainder of its blood needs through replacements by friends and relatives of patients, volunteer blood from the Red Cross, and paid donors. Each paid donor sent by a referring agency receives a fee, part of which goes to him, part to the agency. Last year, volunteers, paid donors, and the Red Cross each provided the MGH with about 10,000 pints. About 4,000 more came as replacements.

Why, many might ask, go to all the effort and expense of attracting people to give away their blood? Why not simply pay donors and get it over with?

While she donates, Miss Scheirer relaxes with a magazine.

Interviewed for donor file

Blood type and iron level tested

Another safeguard: medical history checked

On a national basis, paid donors are considered less safe than volunteers. There exists a danger that hepatitis, an inflammatory liver disease, will be transmitted through a transfusion. In some states, unlike Massachusetts which outlaws commercial blood banks, hepatitis can be a major problem.

At the commercial facilities which buy and sell blood for profit, the donor can walk in off the street and receive cash for a unit of blood. This system attracts drug addicts, alcoholics, and derelicts, among whom the incidence of hepatitis and the incentive to lie about a history of the disease are high.

Even with volunteers, the MGH is constantly on the alert to prevent transfusion-transmitted hepatitis. All donors are interviewed by skilled pathology residents and nurses in an effort to detect the disease (and other conditions) in the donor's history. Anyone with the slightest evidence of having had the illness is barred from donating.

The Blood Bank also tests each unit of blood with the latest method for detecting the type of hepatitis organism (B antigen) most commonly transmitted through transfusions. The procedure is known as a radioactive immunoassay test. It involves reacting a small amount of donor serum with radioactively labeled antibodies to detect hepatitis B antigen.

If a donor's blood is implicated in a suspected case of hepatitis, even if no direct link can be proved, the donor is assumed to be harboring the organism.

With these precautions, the MGH experiences only one suspected case of hepatitis per 3,000 units transfused.

For paid donors the MGH policy is even more strict. No walk-in paid donors are accepted. When the Blood Bank needs them to supplement its volunteer supply, it calls the referring agency and asks for a specific number with the desired blood type. The MGH pays such donors with a check sent through the mails.

Since paid donors often return again and again, the hospital can scrutinize their transfusion records for any sign of hepatitis.

The extra precautions work. Recently the General Accounting Office of the U.S. government studied MGH paid donors and found them actually marginally safer than volunteers.

While this safety might lead some to believe that paid donors are the answer to blood needs, Dr. Huggins responds with a loud, "No."

One barrier to such a system is philosophical. Many feel that paying for blood is wrong. They believe that it is the duty of all qualified individuals to volunteer blood.

In addition, Dr. Huggins, an Associate Professor of Surgery at Harvard Medical School, believes that the MGH type of safe paid donor comes in limited numbers. Though there may never be trouble in finding people willing to sell their blood, blood banks would eventually be forced to dip into less healthy populations if they relied on paid donors.

The MGH has been transfusing blood for almost 70 years. It was not until 1942, however, that Dr. Lamar Soutter, a onetime MGH surgeon, established the Blood Bank.

A decade later, Dr. Morten Grove-Rasmussen, who died in 1972, succeeded Dr. Soutter as its Director. Two years ago Dr. Huggins assumed the post of Clinical Director, later becoming Director.

In the Blood Bank's 32-year history, the science of blood banking has rocketed a few light-years.

Knowledge about blood groups (see page 6 story) and the accuracy of tests for hepatitis have seen great advances.

At one time, blood was collected in glass bottles. Today special plastic bags feature compartments for the various components: plasma, platelets, red cells, and white cells. These components can thus be transfused separately to a patient with a particular need for one or more.

Each component serves a purpose. Red cells carry oxygen from the lungs to the rest of the body. White cells play a role in the body's defenses against infection. Platelets help the blood to clot. And in plasma, all three other components are suspended.

Platelets were the subject of a pioneering MGH contribution to knowledge about blood. These tiny particles had mystified scientists who studied them during the 19th century. In 1906, Dr. J. Homer Wright, then Chief of the MGH Department of Pathology, discovered that platelets form by fragmentation of the large cells (megakaryocytes) in the bone marrow. His finding not only contributed to a basic understanding of platelets and their function but also helped pave the way for the treatment of patients (such as leukemia victims) who lack them.

In 1966, Dr. Huggins himself pioneered a major breakthrough in blood banking: a practical way to preserve red cells in a deep-frozen state for long periods. With this process red cells can be maintained for use long after the normal 21-day outdating mark. Platelets cannot be frozen in this way, and must be used within 72 hours of donation.

Studies in recent years by Dr. Huggins and Dr. Myron B. Laver, an MGH Anesthetist, disclosed that even before the 21-day limit unfrozen red cells lose much of their oxygen-carrying capacity. This begins to drop off rapidly after the third day. For less seriously ill patients, this would not normally present a problem. For surgery requiring large transfusions, however, Dr. Huggins has recommended that patients receive only recently collected or fresh-frozen cells.

The MGH now freezes 30 percent of the blood it collects, thus making possible its high rate of efficient use.

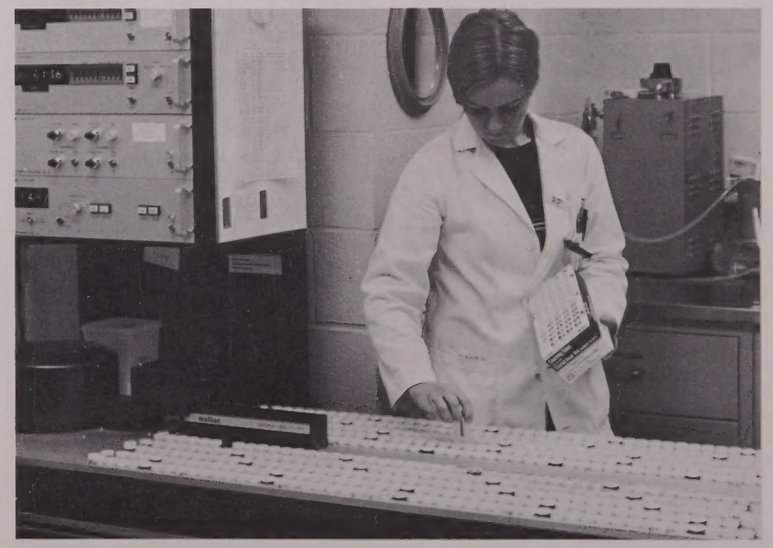
Deep-frozen cells help tide the hospital over the holiday crises which plague blood banks. During the summer and periods around Christmas, New Year, and Labor Day, donations slacken and – because of highway accidents – needs sometimes rise.

Although freezing helps the MGH to weather shortages, the hospital must still spend the months after each holiday replenishing its supplies. Were a disaster, such as a plane crash, to occur during one of these critical periods, it could produce a severe shortage.

The nation's hospitals now transfuse slightly more than six million units of blood a year. If only three percent of the population volunteered its blood once a year, no blood bank would ever again pay for a single unit.

"Giving blood," said Dr. Huggins, "is one of the few more or less totally altruistic things a person can do. I think it is one of the few areas in which almost anyone can make a tremendous contribution to society."

(Related Article on Page 6)



As a safeguard against the most common type of transfusion-transmitted hepatitis, Medical Technician Janet A. Spiers loads a machine with small samples of donor serum.

Have You Ever Met A Lan Negative?

If you have always wanted to meet a Lan negative, the odds are against your succeeding.

Only three persons in the world are known to have the Lan negative factor in their blood.

Lan negative is only one of the many rare blood factors which can trouble blood banks trying to match donor blood with that of a patient about to be transfused.

Fortunately blood banks seldom have to concern themselves with minor groups like the Lan. They do, however, have to ensure that all patients receiving transfusions are given red cells compatible with their own.

The cells must match in the "ABO system," which comprises the four main blood types. The types and approximate percentages of Americans who have them are: O (45), A (40), B (10), and AB (5).

The Rh factors of the donor and patient must also agree. The blood will either contain the Rh antigen (Rh positive) or lack it (Rh negative). An antigen, appearing in donor red cells, can trigger a destructive antibody attack on the cells of a recipient lacking the antigen.

There are also nine other major blood groups: "I" and "i," "P," "MNS," Lewis, Lutheran, Duffy, Kell, Kidd, and Diego. Usually these are unimportant for blood transfusions.

Only about one percent of Americans have an antibody in their blood against one of these nine or any of the minor antigens. The two most common sources of such antibodies are transfusions, in which the antibodies develop in response to the transfusion, and multiple pregnancies, in which the mother develops defenses against a baby's blood. In very rare instances, individuals produce these antibodies spontaneously.

The "I" and "i" grouping is somewhat unusual. All humans are born with the "i" antigen. As they grow to adulthood, all but about 1 person in 15,000 convert from "i" to "I." Thus nearly all children have the "i" antigen, and nearly all adults have "I."

The MGH Blood Bank normally types for ABO and Rh designations in all donors and transfusion candidates. The facility also gives a blanket test for all other factors. If this procedure detects a positive result, further tests are given.

The MGH Blood Bank tries to keep a substantial frozen supply of rare blood factors. In its freezers are several units of Lan negative cells, ready for the day when one of the three Lan negatives, or perhaps a fourth, turns up somewhere in the world in need of a transfusion.

While his wife, Lucy, looks on, anemia patient Jack Baglio of East Boston receives a blood transfusion as part of his treatment.

Useful Data May Lie Buried in Echoes

(Concluded from Page 3)

This approach to ultrasound is based on a huge body of radar-signal processing. With computer analysis, for instance, it is now possible to distinguish the radar reflections from jet and propeller-driven aircraft. When looked at with the naked eye, the two types of radar image are impossible to separate.

In both radar and ultrasound images, there is a great deal of random "noise" such as distortions of the signal and shadows. Behind the noise a computer can see a pattern, a single characteristic which turns up again and again in images of a particular type of object.

"We believe that this technique or a variation of it," Dr. Myers said, "may allow us to tell more about the development of atherosclerotic disease [hardening of the arteries and its consequences]."

"There are two reasons to focus on atherosclerosis," said Dr. Lees, a Lecturer in Medicine at Harvard. "First, it is by far the most prevalent deadly disease in this country, causing 44 percent of all deaths. Second, this disease goes on for a long time. It can be silent for 10 to 20 years and then start causing trouble."

To study atherosclerosis and the effectiveness of long-term treatments, he explained, physicians will have to examine the patient over and over again, a necessity making mandatory a non-invasive method.

It is now possible with commercially available echocardiography equipment to produce a moving picture of the heart in two dimensions. Unfortunately, these pictures are of relatively poor quality. In the near future, these images should be greatly improved. Still later, it should be possible to produce a clearly focused three-dimensional display of the structures within the heart.

Drs. Myers and Lees are confident that the cooperation between the MGH and M.I.T. scientists will enable great strides to occur in all fields of echocardiography.

The doctors point out that physicians are increasing their understanding of the potential value of existing technology, and engineers are gaining valuable insights into applying their expertise to help in solving important medical problems.

The cardiologists are also excited about echocardiography's general prospects. Even when today's vast technology has been exploited, they expect engineering breakthroughs to continue to widen ultrasound's usefulness in medicine.

Why Did the Indians Avoid Treatment They So Badly Needed?

(Continued from Page 1)

portion of Boston's Indians. He is the "street Indian," who is trapped in a heartbreaking cycle.

"They leave home fairly young and undereducated, with no job here and no place to stay," Miss Yukl said. "They are overwhelmed by the city, frustrated, and lonely, so they start drinking in the South End bars and end up in detoxification centers."

About 85 percent of the MGH Indian patients are men whose medical problems are alcohol-related. Why had they avoided the treatment they so desperately needed?

The two social workers believe cultural differences have created an unnecessary barrier between Indians and the institutions that can help them.

Misses Yukl and Klein found that their Indian patients came from communities where sharing is more important than accumulation of possessions, and short-term goals are more important than planning for the distant future. Bravery, self-control, and the freedom and worth of the individual are highly valued.

It is this emphasis on personal dignity that often suffers in contact with the busy, impersonal atmosphere of a hospital with its perplexing routines and the demands imposed on it for paper work. Many Indians have walked out before obtaining proper treatment.

One of the important jobs of Misses Yukl and Klein is to explain hospital procedures to Indian patients and to advise the staff on ways to communicate with them.

It was through an Indian woman, for example, that the two social workers learned how to overcome the Indian aversion to wearing a cast. She suggested that the physician regularly show by X ray the healing going on beneath the cast.

"When he can *see* his progress, the Indian person takes a real interest in his medical problems," Miss Klein said.

The two social workers also serve as a liaison between the Indian patient and community services. On their own time they visited detoxification centers, halfway houses, and the Boston Indian Council, a multiservice center.

"When we started the program," Miss Yukl said, "we had no special direction. It all just fell into place."

In the "Indian Clinic" Robbie Klein, a social worker, raps with Johnny Pious, a Carrier Indian from British Columbia.

Now, they feel certain they have discovered the important factors in developing an effective center for Indians.

The most essential ingredient, and one which cannot be manufactured, is genuine interest. Misses Yukl and Klein have shaped the special program around their regular duties as casework assistants in the Emergency Ward.

"It is important that we are doing this by choice, not from a grant," Miss Yukl said. "They know we are not doing a 'study' or getting extra compensation. We learned that they have all wondered about this."

When they talk about the beauty of the Indian culture, they do so not as scholars or even as counselors, but as friends whose values are in harmony. The patients they see most often, from the MicMac tribe of Canada, are amazed that the two women are learning their language.

One key to breaking the destructive cycle of the Indian migrant is providing an informal, personal place that is an alternative to a South End bar.

Misses Klein and Yukl put a newcomer at ease by mentioning the people they know from his tribe. By phone calls and word of mouth they keep in touch with their patients around Boston. By letters they follow their travels to reservations and back.

To enter the "clinic" is to leave the orderly, white-coated world of the hospital. The two women are casually dressed, the walls cluttered with posters and photographs. Coffee, soft drinks, Indian tobacco, and tribal newspapers are freely shared in the Indian way.

Appointments are done away with. Friends are welcome. Seeing seven people gathered on the floor when he entered, one visitor exclaimed, "This looks like a drop-in center."

"It often seems to them that we don't have any work to do," Miss Yukl said. "There is usually a very fine line

(Concluded on Page 8)

Trudy Yukl, left, and Miss Klein talk with John Lewey, a 90-year-old MicMac Indian.

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"INDIAN CLINIC"

Success Lies in Self-Image, Not Statistics

(Concluded from Page 7)

between rapping and counseling."

Because the Indian has been trained to conceal his emotions, it may be half way through a casual conversation or card game that he reveals, for example, that he recently tried to commit suicide.

Many of the Indian patients have had so few positive experiences with others that their self-worth needs constant reaffirmation. Misses Yukl and Klein have the gift of conveying their belief in the value of each individual.

"We never, never turn anyone away because he is intoxicated. This is different from almost every other center," Miss Klein said.

"They sometimes test us by being hostile, trying really hard to get us to throw them out. Finally they realize we are going to accept them anyway."

Many show potential for the worst or best extremes of human behavior.

One young Indian wrote, "I came to the Indian clinic shortly after its beginning. By then, alcoholism had taken over my life. I lived in despair, loneliness, and frustration. If there was an Indian who needed help, I was one. . . .

"In the beginning it was a battle to get me sober, but they just never gave up." In February 1974, he stopped drinking.

"Today I work as an alcoholism counselor in a detoxification unit. They [Misses Yukl and Klein] have passed on to me the wisdom, strength, and warmth one needs to work with people."

In dealing with an alcoholic of any race, the two social workers have long adhered to the creed of noninterference with an individual and his way of life.

"We never try to change anyone's life-style or to keep him dependent on us," Miss Klein said. "If someone sees his drinking as a problem and wants help, we will call on all our resources. But if he just wants to sit and talk, that's fine."

The women find that often their visitors will, on their own, go to a detoxification center the next day. "That way, not only can they say they *did* it, but they did it their *own* way," Miss Klein said.

The leap in the number of Indian patients seen in the "clinic's" 18 months of operation indicates that it has filled a tremendous void.

But to Misses Yukl and Klein, evidence of success rests not in the statistics but in the improved self-image of each patient in response to the concern shown for him. Increased confidence has encouraged many to hold jobs, find girlfriends, and either to stop drinking or to stay sober for longer periods.

John Ginnish of the MicMac tribe shows Trudy Yukl, social worker, his plans for a drop-in center for Indians in the South End. A former patient, he is now a counselor in a detoxification center.

The two social workers also find that there is less unnecessary use of the Emergency Ward by their patients and more constructive use of the "Indian Clinic" as well as the medical clinics. The total picture shows a far greater continuity of medical care for the Indian patient.

Misses Yukl and Klein proudly display a symbol of this continuity – a brightly painted leg cast which rests on a typewriter stand. In the central image a huge trailer truck is about to run over a stick figure.

"This patient had two of the worst broken legs the doctors had ever seen," Miss Yukl said. "Now he's walking as well as you and I, through sheer willpower."

They believe he might have signed out of the hospital prematurely if they had not visited him frequently.

"He is a tough fighter who had always relied on his physical strength," Miss Klein said. "It's hard being on crutches when you are roaming the streets of the South End."

Misses Klein and Yukl were instrumental in keeping him in the hospital for three months and then explaining why he had to be transferred to a rehabilitation institution.

Later he kept every appointment at the Fracture Clinic, which meets at 7:30 a.m. "One time when he had no place to stay the night before, he slept in the lobby so he wouldn't miss his appointment," Miss Klein said.

"When they see that somebody cares about them, they start caring about themselves," Miss Yukl said. "It really works."

In early November, Miss Klein moved to Albuquerque, New Mexico, where she is continuing commitment to the Indian way of life.

Because the two women share the same dedication and philosophy, they feel that even with Miss Yukl carrying on alone the spirit of the "clinic" will continue unchanged.